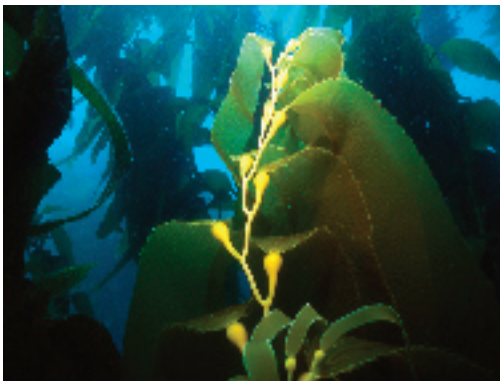
Channel Islands
National Marine Sanctuary


Draft Environmental Impact Statement for the Consideration of Marine Reserves and Marine Conservation Areas

August 2006

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service
National Marine Sanctuary Program

Cover Photo Credits (left to right): Thomas M. Carey; Ralph Clevenger; Robert V. Schwemmer

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

JUL 21 2006

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act of 1969 (NEPA), we enclose for your review a draft environmental impact statement (DEIS) for the establishment of no-take and limited take marine zones in Channel Islands National Marine Sanctuary (CINMS).

Designated by the National Oceanic and Atmospheric Administration (NOAA) in 1980, the CINMS consists of an area of approximately 1,243 square nautical miles off the coast of southern California's Santa Barbara and Ventura counties. The CINMS supports a rich and diverse range of marine life and habitats, unique and productive oceanographic processes and ecosystems, and culturally significant resources.

NOAA is proposing to establish a network of marine zones in the CINMS to further protect biodiversity in the CINMS and complement an existing network of marine zones established by the State of California in October 2002 and implemented in April 2003 under its authorities. Two types of zones are being proposed by this action: marine reserves and marine conservation areas. The proposed action would establish approximately 232.5 square nautical miles of marine reserves and 8.6 square nautical miles of marine conversation areas in the CINMS. All extractive activities (i.e., removal of any sanctuary resource) would be prohibited in marine reserves. Lobster harvest and fishing for pelagic species (with hook and line only) would be allowed within marine conservation areas, while all other extraction would be prohibited. Regulations proposed under this rulemaking would be written in a manner so as to avoid unnecessary redundancy with regulations promulgated by NOAA under the Magnuson-Stevens Fishery Conservation and Management Act.

Written comments submitted on this DEIS must be received by NOAA by October 10, 2006. Written comments should be submitted to Chris Mobley, CINMS Superintendent, NOAA National Marine Sanctuary Program, 113 Harbor Way, Suite 150, Santa Barbara, California, 93109. Electronic comments may be submitted to CINMSReserves.DEIS@noaa.gov. A copy of your comments should also be sent to me at NOAA/PPI, SSMC3, Room 15603, 1315 East-West Highway, Silver Spring, MD 20910.

Sincerely,

for Rodney F. Weiher, Ph.D.
NOAA NEPA Coordinator

Enclosure

- THIS PAGE INTENTIONALLY BLANK -

EXECUTIVE SUMMARY

This Draft Environmental Impact Statement (DEIS) analyzes the impacts of various alternatives considered to establish marine zones in the Channel Islands National Marine Sanctuary (CINMS or Sanctuary), located offshore southern California. Marine zones are discrete areas contained within or above a national marine sanctuary that have special regulations differing from the regulations that apply throughout or above the Sanctuary as a whole. The purpose of these proposed zones is to further the protection of Sanctuary biodiversity and complement an existing network in the Sanctuary established by the State of California in October 2002 and implemented in April 2003 under its authorities. Two types of zones are being proposed by this action: marine reserves and marine conservation areas. All extractive activities (e.g., removal of any Sanctuary resource) would be prohibited in all zones of the Sanctuary designated a marine reserve. Certain lobster harvest and fishing for pelagic species would be allowed within zones of the Sanctuary designated as marine conservation areas, while all other extraction would be prohibited.

The National Oceanic and Atmospheric Administration (NOAA) is the lead agency for this action. NOAA's National Marine Sanctuary Program (NMSP) is the implementing program for this action. This action would establish a comprehensive marine reserve and marine conservation area network in State and Federal waters of the Sanctuary. Comprehensive network options were originally developed by NOAA and the California Department of Fish and Game (CDFG) following a stakeholder process conducted from 1999 through 2002. In 2002, the California Fish and Game Commission (FGC) supported establishment of a comprehensive network in both State and Federal waters of the Sanctuary by implementing the State waters portion of the network.

Concurrent with this NMSP action, NOAA is proposing to amend the Pacific Coast Groundfish Fishery Management Plan (Groundfish FMP) to protect essential fish habitat along the west coast of the United States. This amendment would complement the existing State marine zones by prohibiting the use of bottom contact fishing gear in the Federal waters of the proposed zones.[1] The proposed action analyzed in this DEIS and the amendment to the Groundfish FMP (and its associated regulations) would be implemented with a cooperative and coordinated approach. The Groundfish FMP amendment is detailed in Section 3.0.

Background and History

The consideration of marine zones within the CINMS over the last six years is described below in three distinct phases: 1) the community-based phase; 2) the State regulatory phase; and 3) the Federal regulatory phase, which is the focus of the proposed action in this DEIS. These three phases are collectively referred to as the "Channel Islands Marine Reserves Process."

[1] EFH designation would apply to both State and Federal waters; the associated regulations, however, only apply to Federal waters.

Community-based Phase, 1998-2002

In 1998, the FGC received a recommendation from a local recreational fishing group to create marine reserves around the northern Channel Islands as a response to declining fish populations. The group recommended that 20 percent of the shoreline outward to 1 nautical mile (NM) should be closed to all fishing. In addition, during public scoping for the CINMS management plan review, the public voiced similar concerns regarding declines in resources and recommended the application of ecosystem-based management tools, such as marine reserves. As a result, the NMSP began to investigate possible courses of action, including working with the State of California, to address the issues articulated by the public.

In April 1999, the NMSP and the CDFG developed a joint Federal and State partnership and process to consider establishing marine reserves within the CINMS. To support this joint process, the Sanctuary Advisory Council (SAC), which is comprised of local community and Federal, State and local government agency representatives, created a multi-stakeholder Marine Reserves Working Group (MRWG) to seek agreement on the establishment of marine reserves within the CINMS. From July 1999 to May 2001, the MRWG met monthly to receive, weigh, and integrate advice from a Science Panel, Socio-economic Team, and the public and to develop a marine reserves recommendation. The MRWG identified the problems to be addressed in a consensus Statement:

> *The urbanization of southern California has significantly increased the number of people visiting the coastal zone and using its resources. This has increased human demands on the ocean, including commercial and recreational fishing, as well as wildlife viewing and other activities. A burgeoning coastal population has also greatly increased the use of our coastal waters as receiving areas for human, industrial, and agricultural wastes. In addition, new technologies have increased the efficiency, effectiveness, and yield of sport and commercial fisheries.*
>
> *Concurrently, there have been wide scale natural phenomena such as El Niño weather patterns, oceanographic regime shifts, and dramatic fluctuations in pinniped populations.*
>
> *In recognizing the scarcity of many marine organisms relative to past abundance, any of the above factors could play a role. Everyone concerned desires to better understand the effects of the individual factors and their interactions, to reverse or stop trends of resource decline, and to restore the integrity and resilience of impaired ecosystems.*
>
> *To protect, maintain, restore, and enhance living marine resources, it is necessary to develop new management strategies that encompass an ecosystem perspective and promote collaboration between competing interests. One strategy is to develop reserves where all harvest is prohibited. Reserves provide a precautionary measure against the possible impacts of an expanding human population and management uncertainties, offer education and research opportunities, and provide reference areas to measure non-harvesting impacts.*

Following the development of this Statement, the MRWG then reached consensus on the following goals for marine reserves:

- To protect representative and unique marine habitats, ecological processes, and populations of interest;
- To maintain long-term socioeconomic viability while minimizing short-term socioeconomic losses to all users and dependent parties;
- To achieve sustainable fisheries by integrating marine reserves into fisheries management;
- To maintain areas for visitor, spiritual, and recreational opportunities which include cultural and ecological features and their associated values; and
- To foster stewardship of the marine environment by providing educational opportunities to increase awareness and encourage responsible use of resources.

From March to May 2001, the MRWG mapped marine reserve networks in nearshore/State and offshore/Federal waters of CINMS to achieve the goals identified above. Over 40 possible marine reserve networks were developed. In May 2001, the MRWG forwarded to the SAC the problem Statement, goals, a suite of implementation recommendations, the Science Panel recommendations, and the socio-economic analyses. A composite map with two reserve network options ranging from 12 to 29 percent of the Sanctuary was also forwarded. In June 2001, the SAC transmitted the full public record of the MRWG to the NMSP and CDFG, and requested the agencies craft a final recommendation for the FGC.

CDFG and the NMSP continued to work with stakeholders to design a reserves network that built on community input, addressed scientific criteria, and satisfied agency mandates. In August 2001, CDFG and the NMSP forwarded the full public record to the FGC along with a recommended marine reserve network. The FGC directed the CDFG to initiate a State rulemaking process based on the agencies' recommended marine reserve network.

State Phase, 2002 to 2003

The CDFG prepared environmental documents in accordance with the California Environmental Quality Act (CEQA) that included an analysis of five alternative reserve networks and a no-project alternative (CDFG 2002). The alternatives analyzed in the CEQA document were split into an initial State waters phase and subsequent Federal phase. The NMSP and CDFG's recommended network was identified as the preferred alternative (CDFG 2002). The State's rulemaking process and Environmental Impact Report (EIR) assessed the potential cumulative effects of the alternatives that included State and Federal waters of the CINMS.

In October 2002, the FGC approved the preferred alternative in the EIR that included ten marine reserves and two conservation areas within State waters, which encompass approximately 102 nmi^2 of the CINMS. NOAA and the National Park Service supported the FGC's decision. The State water portion of the marine zones went into effect in April 2003.

Federal Phase, 2003 to the present

Following the publication of the CDFG's final regulations in 2003, the NMSP hosted scoping meetings with the general public, CINMS Advisory Council, and PFMC. In 2004, the NMSP released a preliminary environmental document with a range of draft alternatives for public review. In 2005, the NMSP consulted with local, State, and Federal agencies and the PFMC on possible amendments to the CINMS designation document pursuant to section 303(b)(2) of the National Marine Sanctuaries Act, as amended, (NMSA) (16 U.S.C. 1433(b)(2)). In addition, in 2005 the NMSP provided the PFMC with the opportunity to prepare draft sanctuary fishing regulations pursuant to section 304(a)(5) of the NMSA (16 U.S.C. 1434(a)(5)) for the potential establishment of marine reserves and marine conservation areas.

In its response to NOAA's letter regarding draft fishing regulations, the PFMC Stated its support for NOAA's goals and objectives for marine zones in the CINMS but recommended that NOAA issue fishing regulations under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the relevant authorities of the States of California, Oregon, and Washington rather than under the NMSA. To that end, and in accordance with advice from the NOAA Administrator in his October 19, 2005 letter to the PFMC, the PFMC recommended the Channel Islands marine zones in Federal waters be designated as Essential Fish Habitat and Habitat Areas of Particular Concern under Amendment 19 of the Groundfish FMP. Corresponding management regulations issued by NOAA under the MSA would prohibit the use of bottom contact gear, while the water column in the marine zones would be closed under other fishery management plan authorities and complementary State laws.

NOAA reviewed the PFMC's recommendations and determined that they did not have the record or specificity to support the use of the MSA or State laws to establish limited take or no-take zones in the water column and thereby did not fulfill NOAA's goals and objectives for marine zones in the CINMS. Amendment 19 to the Groundfish FMP would implement, in part, the proposed marine zones by prohibiting all bottom contact gear in those proposed zones. Accordingly, the proposed NMSA regulations analyzed in this DEIS will prohibit the take of resources from the proposed zones not prohibited by the Amendment 19 regulations. Thus, along with Amendment 19, the proposed NMSA regulations would establish comprehensive limited take and no-take zones in the CINMS in a manner that fulfills NOAA's goals and objectives for the marine zones in the CINMS.

Contents of this Document

This document is comprised of the following sections:

Section 1: Introduction and Background

This section provides a summary of the NMSP, the CINMS, other relevant management authorities, and a description of the project location.

Section 2: Purpose and Need

This section briefly specifies the underlying purpose and need that the NMSP is addressing with this action.

Section 3: Proposed Action and Alternatives

This section details the range of reasonable alternatives the NMSP identified as likely to address the purpose and need. It also includes the criteria the NMSP used for developing this range. The NMSP is proposing to incorporate the existing State marine zones and extend seven of the State marine reserves, add one new marine reserve and extend one of the State marine conservation areas into deeper waters of the CINMS. All extractive activities (e.g., removal of any Sanctuary resource) would be prohibited in all areas of the Sanctuary designated as a marine reserve. All extractive activities would be prohibited in all areas of the Sanctuary designated as marine conservation areas with the exception of certain lobster harvest and recreational fishing for finfish. Section 2 further details the need for this action and the associated objectives.

Section 4: Affected Environment

This section describes the current baseline conditions of the marine ecosystems and human uses potentially affected by the proposed action.

Section 5: Environmental Impacts

This section provides an analysis of the ecological and socio-economic impacts associated with each alternative described in this EIS. These impacts are summarized as follows:

Ecological Impacts

The implementation of marine zones in the CINMS is expected to have beneficial ecological impacts on marine communities and habitats. The analysis of ecological impacts was based on numerous scientific studies done on the efficacy of marine zones in the CINMS, California, and other parts of the world. Based on this information, the ecological impacts of implementing the proposed action are anticipated to be as follows:

- The abundance, size, biomass, and diversity of targeted (fished) species in the Sanctuary is expected to increase within the marine zones as compared to areas outside of these marine zones;[2]
- Habitats supporting marine populations are expected to benefit via reduced disturbance and destruction of physical structures by fishing gear;
- Although displacement of fishing effort resulting from implementation of the marine zones may increase fishing pressure outside their bounds, vessel distribution and socioeconomic analyses indicate that relatively little fishing activity occurs within the

[2] Species that are not fished or not fished heavily may not show significant changes in abundance and size as a result of marine zone designation.

proposed marine zones. Hence, little fishing activity congestion is expected outside these marine zones.

Socioeconomic Impacts

NOAA gathered and analyzed socioeconomic information for the CINMS through 2003. Analyses were based on a two-step approach: Step 1 analyses describe the potential impacts of the alternatives in this DEIS for commercial fisheries, consumptive recreational activities, and non-consumptive recreational activities. Step 2 analyses describe the factors that contribute to potential costs and, when possible, the benefits of the designation of the marine zones within the CINMS. In general, these analyses characterize the socioeconomic impacts as:

- Having a small impact on existing consumptive activities (commercial fishing and consumptive recreational activities).
- Beneficial to non-consumptive recreational users. These increased benefits take the form of increases in diversity of wildlife, viewing opportunities from increased abundance of fish and invertebrates, water quality, etc. Benefits may also be derived from the decrease in the density of users or in the reduction in conflicts with consumptive users.
- Beneficial to management, research, and education because relatively undisturbed areas (i.e., reference areas) will be available for comparison with areas outside the marine zones; and
- Beneficial for intrinsic and heritage purposes.

Management Considerations

Going beyond an analysis of the ecological and socioeconomic impacts, NOAA also assessed the impacts of the various alternatives on the management of the proposed zones. This assessment notes distinctions among the management regimes that would be possible under the various alternatives.

Other Sections and Appendices

The remainder of the DEIS includes a glossary, list of preparers, references, and several appendices.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION AND BACKGROUND

This section provides context for the proposed action. A summary of the NMSP, the CINMS, other relevant management authorities, and a description of the project location are included.

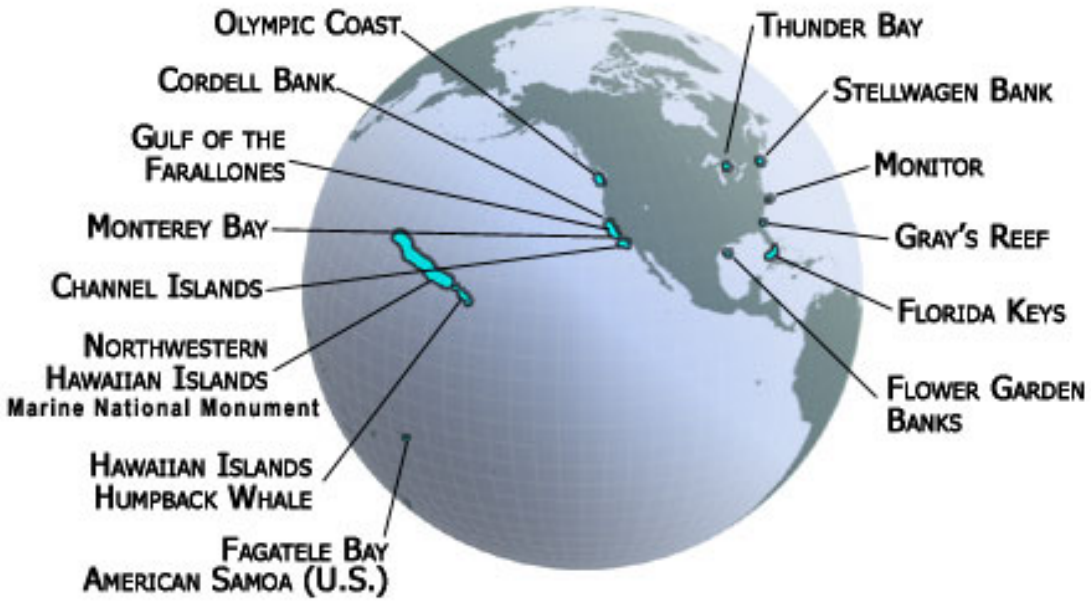
1.1 The National Marine Sanctuary Program

Under the NMSA the Secretary of Commerce is authorized to designate and manage areas of the marine environment as national marine sanctuaries. Such designation is based on attributes of special national significance, including conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities. The primary objective of the NMSA is to protect all natural and historical resources of national marine sanctuaries.

The mission of the NMSP "is to identify, designate and manage areas of the marine environment of special national, and in some cases international, significance due to their conservation, recreational, ecological, historical, research, educational, or aesthetic qualities." (15 CFR 922.2(a)) Per the NMSA, the NMSP strives to improve the conservation and management of marine resources and seeks to "maintain for future generations the habitat, and ecological services, of the natural assemblage of living resources that inhabit these areas" (16 U.S.C. 1431 (a)(4)(C)). This statutory finding guides the NMSP to take a broad and comprehensive management approach consistent with the NMSA's primary objective of resource protection. The focus of such an approach is broad-scale, ecosystem-level protection and management, unique from the various agencies and laws directed at managing single or limited numbers of species or specific human activities within the ocean.

To date, thirteen national marine sanctuaries and one national marine monument have been designated by the Secretary of Commerce, Congress, or the President. These national marine sanctuaries include both nearshore and offshore marine areas. Their designation provides protection for sensitive marine ecosystems, such as coral reefs and kelp forests, other habitats used by ecologically and economically important marine species, and historically significant shipwrecks and artifacts. In addition, these areas serve as valuable educational, recreational, scientific, and economic resources. NMSP regulations implement the NMSA and are codified at 15 CFR Part 922.

Figure 1 Map of the National Marine Sanctuary System



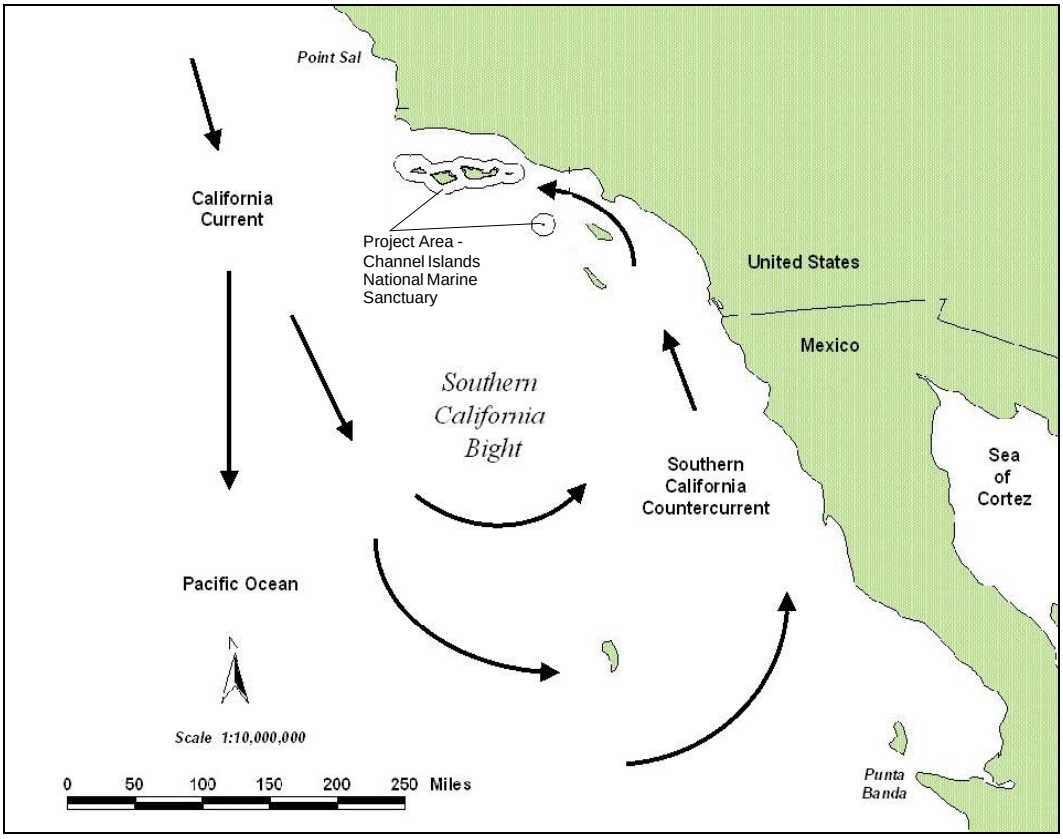
1.2 Project Location - The Channel Islands National Marine Sanctuary

Designated in 1980, the CINMS consists of an area of approximately 1,243 square nautical miles (nmi^2) off the southern coast of California. The Sanctuary boundary begins at the mean high water line and extends seaward to a distance of approximately six nautical miles (nmi) from the following islands and offshore rocks: San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock (collectively the Islands). Located offshore from Santa Barbara and Ventura counties, the Sanctuary supports a rich and diverse range of marine life and habitats, unique and productive oceanographic processes and ecosystems, and culturally significant resources. A comprehensive characterization of the ecological, regulatory, and human setting of the CINMS may be found in CDFG (2002), NCCOS (2005), and Section 3 of the DEIS for the CINMS Draft Management Plan (NOAA 2006).

The CINMS is at the northwestern end of a much larger area referred to as the Southern California Bight (SCB) (Dailey *et al.* 1993). The SCB is formed by a transition in the California coastline wherein the north-south trending coast begins to trend east-west. Figure 2 shows the location of the CINMS within the SCB.

The rich oceanic and island areas of the CINMS are protected by multiple levels of government. The Islands are designated as a National Park by the Department of the Interior. The Park's boundary extends to one nmi offshore of the Islands, overlapping the CINMS boundary. In 1986, the United Nations Educational, Scientific and Cultural Organization Program on "Man and the Biosphere" designated the Channel Islands Biosphere Reserve as part of the international network of Biosphere Reserves. In October 2002, the FGC approved the designation of ten marine reserves and two conservation areas within State waters of the CINMS, which encompass approximately 102 nmi^2 of the Sanctuary (CDFG 2002). NOAA and the National Park Service supported the State's action. This designation was one product of the Channel Islands Marine Reserve Process that began in 1999 and was based on a collaboration and partnership with Federal and State agencies, fishers, and conservationists from the region. The State's marine zones went into effect in April 2003.

Figure 2 Southern California Bight



2.0 PURPOSE AND NEED

2.1 Purpose of This Action

The primary objective of the NMSP is to protect national marine sanctuary resources (16 U.S.C. 1431). The NMSA compels the NMSP to take a broad and comprehensive, ecosystem-based approach to management and marine resource protection. The NMSA (16 U.S.C. 1431(a)(3)) States that "…while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment." The NMSA also States that the NMSP is to "maintain the natural biological communities in the national marine sanctuaries and to protect and, where appropriate, restore and enhance the natural habitats, populations and ecological processes" (16 U.S.C. 1431(b)(3)).

Thus, the NMSP is proposing this action to meet the following six goals:

- To ensure the long-term protection of Sanctuary resources by restoring and enhancing the abundance, density, population age structure, and diversity of the natural biological communities.
- To protect, restore, and maintain functional and intact portions of natural habitats (including deeper water habitats), populations, and ecological processes in the Sanctuary.
- To provide, for research and education, undisturbed reference areas that include the full spectrum of habitats within the CINMS where local populations exhibit a more natural abundance, density, diversity, and age structure.
- To set aside, for intrinsic and heritage value, representative habitats and natural biological communities.
- To complement the protection of CINMS resources and habitats afforded by the State of California's marine reserves and marine conservation areas.
- To create models of and incentives for ways to conserve and manage the resources of CINMS.

These goals attempt to address the MRWG's consensus based goals and are intended to be consistent with the State's goals described in the Marine Life Protection Act.

2.2 Need for Action

Marine resources in the SCB have declined under pressure from a variety of factors, including commercial and recreational fishing, changes in oceanographic conditions associated with El Niño and other large-scale oceanographic cycles, introduction of disease, and increased levels of pollutants (McGowan *et al.* 1998; McGinnis 2006; Jackson *et al.* 2001; Dugan and Davis 1993). Science shows that prior to and since the designation of the CINMS, community structure and species diversity have changed in accordance with hydrographic perturbations, climate-ocean

variability, and marine resource use (Hayward *et al.* 1996; McGowan *et al.* 1998; Jackson *et al.* 2001). Roemmich and McGowan (1995a, b) document large-scale declines in primary and secondary biological productivity throughout the SCB between 1951 and 1993.[3]

In addition to large-scale changes in the marine ecosystems of the SCB, there has been a change in the level of marine resource use of the CINMS (Leeworthy and Wiley 2005). New markets for commercial fisheries have emerged since 1980 (Dugan and Davis 1993), adding pressure to significant commercial and recreational fisheries. CDFG data show decreases in landings for several categories of commercial and recreational fisheries (Leet *et al.* 2001; CDFG 2002). Jackson *et al.* (2001) and Dayton *et al.* (2003) have documented that fishing has changed the productivity, biological diversity, and provision of ecosystem goods and services of marine ecosystems of the SCB.

Fishery managers, such as NOAA Fisheries and CDFG, typically use fishing seasons and/or gear type restrictions, size and bag limits, temporary area closures, and other effort control measures to manage commercial and recreational harvests. Fisheries management tends to focus on optimizing the catch of a single target species and often does not address habitat, predators, and prey of the target species and other ecosystem components and interactions (Goodman *et al.* 2002; Pikitch *et al.* 2004). In addition, many former natural refuges for fished species, such as submarine canyons, submerged pinnacles, deep waters, and waters distant from harbors, can now be accessed due to advancements in fishing technology and increased fishing effort (Agardy *et al.* 2003).

An alternative approach to existing single-species fisheries management is ecosystem-based management, which recognizes that ecosystems, and the natural and human factors that influence them, are interdependent. Numerous government and scientific reports highlight the importance of protected areas to support ecosystem-based management (Rosenberg, A.A. and K.L. McLeod 2005; McLeod, K. L., J. Lubchenco, S. R. Palumbi, and A. A. Rosenberg, 2005). In ecosystem-based management, the direct and indirect effects of human activities are considered when making decisions about human interactions with resources, recognizing that marine systems are not static and acknowledging the uncertainties in the biotic, abiotic, and human components. The number of documented successful examples of no-take marine reserves is growing, providing substantial evidence that rapid increases in biomass, biodiversity, abundance and size of organisms usually result from their designation (Paddack and Estes 2000; Schroeder and Love 2002; Halpern 2003; Micheli and Halpern 2005). Increased biodiversity, abundance, and habitat quality within closed areas generally improve the resiliency and ability of marine ecosystems to adapt to ongoing human-caused or natural disturbance, such as climate shifts, major storm damage, and pollution (Lauck et al. 1998, NRC 2000, Roberts et al. 2003).

[3] The status of the marine environment of the CINMS is described further in Section 4.0 of this DEIS. A comprehensive description of the ecology and human uses of the CINMS may be found in CDFG (2002), NCCOS (2006), and Appendix F of the CINMS Draft Management Plan /DEIS (NOAA 2006).

The designation of marine reserves can also reinforce traditional fish management approaches to substantially reduce overall fishery impacts to the ecosystem. Traditional management, like controls on fishery catch and effort, often fails due to factors such as stock assessment errors, inadequate institutional frameworks, and uncertainty (Hilborn et al, 2004). Marine reserves can help to rebuild depleted populations, reduce bycatch and discards, and reduce known and as-yet-unknown ecosystem effects of fishing (Roberts *et al.* 2003). In addition, marine reserves offer scientists and resource managers a controlled opportunity to study the influence of change on marine ecosystems in the absence of direct human disturbance (PFMC 2004). As such, NOAA is proposing a network of marine reserves as a powerful ecosystem-based management tool to address the loss of marine biodiversity and ecosystem function, and increase the probability of long-term ecosystem resiliency and health of the Sanctuary.

3.0 ALTERNATIVES

3.1 Development of Alternatives

This section provides a description of the process by which the NMSP developed the range of alternatives in this DEIS.

3.1.1 Overview

The alternatives analyzed in this DEIS were reduced from a large number of options developed during the MRWG process, the State CEQA process, public scoping for this DEIS, and through consultation with the other agencies and the PFMC. The factors taken into consideration during this analysis include:

- The ability of an alternative to meet the Stated purpose and need;
- Consistency with the MRWG recommendations;
- Consistency with the existing State marine zones;
- Public scoping comments;
- Input from CDFG, NMFS, and the PFMC;
- The best available ecological and economic information; and
- The administrative requirements to properly manage any action, including monitoring and enforcement.

Originally, over 40 marine reserve network maps were developed as part of the MRWG deliberative process. Based on the scientific literature and habitat distribution maps, the MRWG's Science Advisory panel (SAP) provided ecological criteria to assess the potential ecological benefits of various marine reserve networks. The MRWG's Socioeconomic Team developed spatially-explicit socioeconomic use information, based on available information such as CDFG fishing log books and user survey data, to assess the relative socioeconomic impacts of different network options on consumptive users. Through an iterative mapping process using geographic-information-system (GIS) software, the MRWG developed a composite map that attempted to balance ecological benefits with potential short-term socioeconomic impacts on commercial and recreational fishermen. The CDFG and NMSP used the composite map to develop the preferred alternative in the CDFG's 2002 EIR.

3.1.2 Other Factors Considered

3.1.2.1 Alternative Management Approaches

In the development of the alternatives analyzed in this DEIS, the NMSP considered the potential for achieving the purpose and need through actions that could be taken by other agencies under authorities other than the NMSA. Of particular relevance is NOAA's issuance of fishing

regulations (71 FR 1998) to protect essential fish habitat (EFH)[4] within the CINMS under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). NOAA's NMFS is the implementing program for that action.

NMFS has recently issued a rule to implement Amendment 19 to the Groundfish FMP (71 FR 27408). Amendment 19 provides for a comprehensive program to describe and protect EFH for Pacific coast groundfish. NMFS has made a preliminary determination that it is necessary to take precautionary action to protect EFH from the possible adverse impacts of fishing. As part of the Amendment 19 regulation, NMFS has prohibited the use of bottom contact gear[5] in the Federal waters of the marine zones described in Alternative 1 in this DEIS.

The NMFS rule States that the EFH measures will have a minimal impact on the fishery (71 FR 1998). The closures are mainly in areas that are not currently being fished. For areas that would require the industry to shift its location, the effect would be on less than 10 percent of the fishery (coast wide). That amount of effort is likely to be able to relocate so that there would be little net change in overall catch. Thus the proposed management measures would have insignificant adverse socioeconomic consequences.

The EFH rule, final environmental impact Statement and other background documents are available at http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/EFH-Final-EIS.cfm and at the PFMC website at http://www.pcouncil.org. The proposed management measures are in accordance with the MSA, the Groundfish FMP, and 50 CFR parts 600 and 660 subpart G (the regulations implementing the Groundfish FMP).

The Amendment 19 action alone, which is limited to prohibiting the use of bottom-contact fishing gear, does not completely fulfill the purpose and need defined in this DEIS. The proposed NMSA regulations would not only address fishing activities not covered by Amendment 19, but also other actions that are not being addressed under the MSA (e.g., scientific research, education, industrial and commercial activities).

3.1.2.2 Marine Conservation Areas – Allowing Limited Take

Several comments received during the scoping process for this action requested the NMSP to consider allowing limited take of pelagic finfish in certain marine zones being considered, such

[4] Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802(10)).

[5] Bottom Contact Gear is defined as fishing gear designed or modified to make contact with the bottom. This includes, but is not limited to, beam trawl, bottom trawl, dredge, fixed gear, set net, demersal seine, dingle bar gear, and other gear (including experimental gear) designed or modified to make contact with the bottom. Gear used to harvest bottom dwelling organisms (e.g., by hand, rakes, and knives) are also considered bottom contact gear (71 FR 27408)

as the proposed "Footprint" region south of Anacapa and Santa Cruz Islands. The primary arguments put forward in these comments to support allowing the take of pelagic finfish were:

- Pelagic species are highly mobile and do not stay in marine reserves long enough to be protected by any restriction imposed therein;
- Because of their mobility, there are no real ecological benefits to prohibiting the take of pelagic finfish in marine reserves; and
- Because there are no ecological benefits, the economic costs of prohibiting the take of pelagic finfish with marine reserves are not justified.

Regarding their mobility, some pelagic species are known to aggregate in particular areas (Heyman 2004; Worm *et al*. 2005). Aggregation sites have been observed in open water just offshore from promontories, at the edges of continental margins, above steep slopes, and in upwelling areas. Several areas with these characteristics are within the proposed zones in Alternatives 1 and 2, including the deep continental shelf north of Harris Point on San Miguel Island and southeast of Santa Barbara Island, and the edge of the Santa Cruz submarine canyon.

While marine reserves are not expected to yield the same benefits for highly migratory pelagic species (including thresher and mako sharks, tuna, and billfish), there are likely to be positive ecological impacts of protecting these species while they are within reserves (Gerber *et al*. 2005; Hooker and Gerber 2004). Many of these species play important roles as apex predators within the marine ecosystem. Their removal from the system may lead to trophic cascades that change the ecosystem structure, in some cases altering the composition and productivity of the system (Sosa-Lopez *et al*. 2005). Allowing the take of highly migratory pelagic species from protected areas therefore has the potential to disrupt the ecological relationship between these predators and their prey. Conversely, protecting pelagic species while they are within reserves will allow these ecological processes to occur naturally, potentially leading to greater abundance, density, diversity and age structure of local populations.

Regarding the economic impacts, the effect of reserves on pelagic fisheries (commercial and recreational) is expected to be extremely low (see Section 5.2). The potential impacts are especially low when compared with the catch of pelagic species from other locations in Southern California. Furthermore, the proposed action would still allow these species to be caught outside reserves, while still protecting aggregation sites and the entire trophic structure of a reserve area (as discussed above).

In addition, management measures and regulations for marine conservation areas are necessarily more complicated and difficult to enforce than reserves. For example, to enforce marine conservation area regulations, enforcement agents would have to make on-water determinations as to the type and disposition of gear, the species being taken, and the location of the vessel (relative to the zone boundaries).

The DFG and NMSP considered all of these factors while developing the range of alternatives for the State and Federal actions, respectively. The State marine zones include two marine conservation areas (Anacapa Marine Conservation Area and Painted Cave Marine Conservation Area). In these two cases, it was determined that the overall benefits of limited take status in these conservation areas might be studied in comparison to the overall benefits of no-take status in marine reserves. Alternatives 1 and 2 include these same areas.

3.2 Description of Alternatives

There are three principal alternatives analyzed in this DEIS: two zoning alternatives and a no-action alternative. The no-action alternative reflects the expected management environment that would occur without any action taken by the NMSP. Alternatives 1 and 2 were adapted principally from alternatives in the CDFG's 2002 EIR and identify two different spatial compositions for the proposed marine zone network.

Alternative 1 contains three sub-alternatives (Alternative 1a, 1b, and 1c) based on differing boundary options relative to the existing State marine zones.

- In Alternative 1a, the boundaries of the proposed marine zones (and their corresponding regulations) would completely overlay the existing State marine zone boundaries and terminate at the mean high water line of the Channel Islands. Alternative 1a is the NMSP's preferred alternative.
- In Alternative 1b, the boundaries of the proposed marine zones (and their corresponding regulations) would abut the existing State marine zone boundaries, thereby including a small portion of State waters.
- In Alternative 1c, the boundaries of the proposed marine zones would terminate at the existing State-Federal waters boundary (3 nmi from shore). Because most of the existing State marine zones do not extend all the way to State-Federal waters boundary, Alternative 1c would result in small gaps of unprotected waters between most of the proposed Federal marine zones and the existing State marine zones.

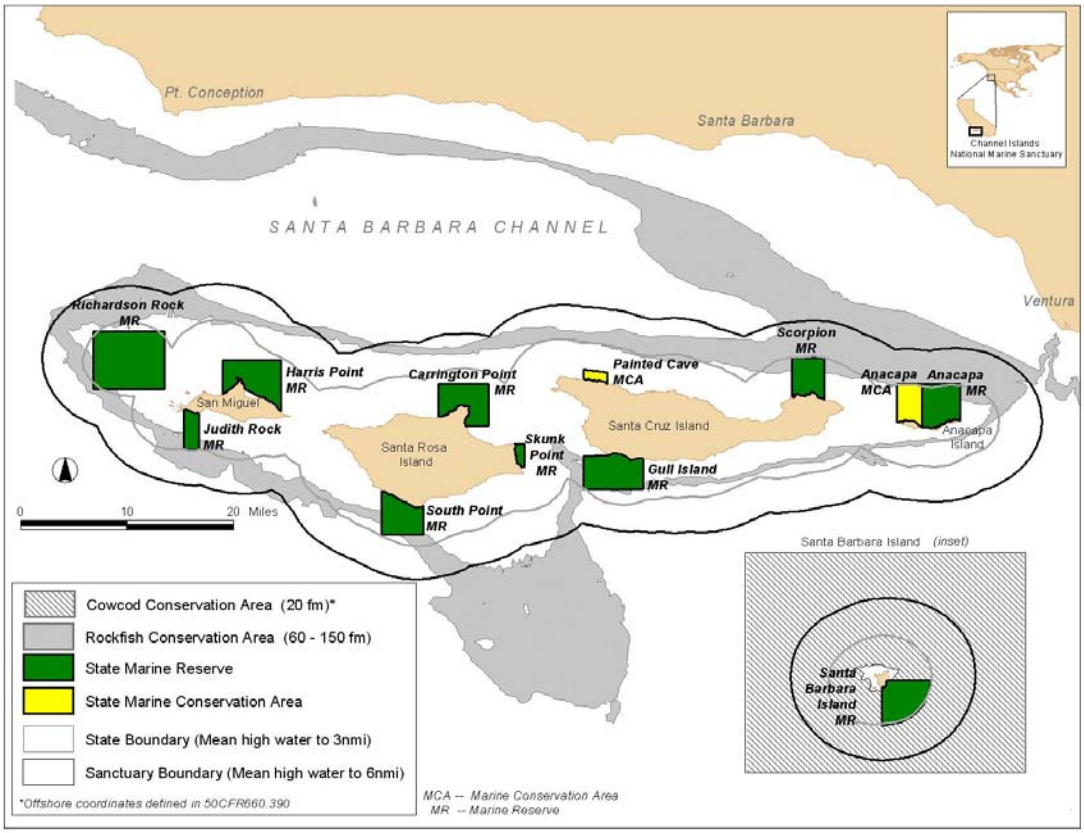
Each of these alternatives is described in more detail below.

3.2.1 No Action (Status Quo) Alternative

The no action alternative (Figure 3) would maintain the *status quo* in the Sanctuary (i.e., no new marine zones would be designated). Under this alternative, the NMSP would take no new regulatory action under the NMSA. Existing Sanctuary regulations (e.g., no discharge) would continue to apply throughout the CINMS. Existing State marine reserves and marine conservation areas and existing State and Federal management of commercial and recreational activities, including fishing, would remain in place. State marine zones contain 11 marine reserves and two marine conservation areas (see Table 7). Examples of existing fishery

management measures that would remain in effect include the Cowcod Conservation Area closures; the rockfish conservation emergency regulations; Amendment 19 to NOAA's Groundfish FMP that prohibits the use of all bottom contact gear in the Federal waters of the marine zones proposed in Alternative 1 of this DEIS.[6]

Figure 3 No Action Alternative



3.2.2 Alternative 1a (Preferred Alternative)

Under Alternative 1a, the NMSP would establish a series of marine zones. This alternative was developed by the CDFG and NMSP in 2001, based on the extensive work of the MRWG and its advisory panels, and is the original proposed project in the CDFG 2002 EIR. This alternative was also adopted by the FGC in 2002. The portions of the zones within State waters[7] were established by the FGC and CDFG in 2003 with State marine zoning regulations.[8] Alternative 1a

[6] See Appendix F for a detailed review of the existing fisheries management measures within CINMS.
[7] State waters around the Channel Islands extends from the mean high water line offshore to 3 nmi.
[8] Title 14, section 632 of the California Code of Regulations.

would complete the Channel Islands marine reserves network by extending the network into Federal waters as envisioned by the State's 2002 action and supported by NOAA and the National Park Service (NPS).

When compared to the no-action alternative, Alternative 1a would add nine new marine zones, eight of which are no-take marine reserves and one a limited take marine conservation area. A total of 138 nmi^2 would be added as marine reserves and 1.7 nmi^2 as a marine conservation area (these totals include additional State waters zones). For a description of the various ecological attributes of Alternative 1a, see Section 3.3

The following restrictions would apply to Alternative 1a:

- *In a marine reserve it would be unlawful to harvest, remove, take, injure, destroy, possess,[9] collect, move, or cause the loss of any living or dead organism, historical resource, or other Sanctuary resource, or attempt any of these activities. It would also be unlawful to possess fishing gear on board a vessel unless such gear is stowed and not available for immediate use.*
- *In the marine conservation area, it would be unlawful to harvest, remove, take, injure, destroy, possess,[10] collect, move, or cause the loss of any living or dead organism, historical resource, or other Sanctuary resource, or attempt any of these activities, except that certain commercial and recreational fishing for lobster and recreational fishing for pelagic finfish[11] are allowed. It would also be unlawful to possess fishing gear on board a vessel, except legal fishing gear used to fish for lobster or pelagic finfish, unless such gear is stowed and not available for immediate use.*

The proposed regulations to implement these restrictions were drafted to be consistent with the regulations the State has adopted for the existing State marine zones. The proposed regulations would only prohibit those extractive activities within marine reserves that are not already prohibited by 50 CFR part 660, which are the NOAA regulations that govern fishing for "West Coast fishery management unit species." Therefore, an extractive activity prohibited by NOAA fishing regulations would not be prohibited by the proposed Sanctuary regulations. The proposed regulations for the marine conservation areas would similarly prohibit most extractive activities, but allow lobster harvesting and recreational fishing for pelagic finfish.

[9] Vessels would be allowed to transit through, or be at anchor in, a marine reserve with legal catch onboard provided fishing gear is stowed and not available for immediate use.

[10] Vessels would be allowed to transit through, or be at anchor in, a marine conservation area with legal catch onboard provided fishing gear is stowed and not available for immediate use.

[11] Pelagic finfish are defined as: northern anchovy (*Engraulis mordax*), barracudas (*Sphyraena spp*.), billfishes (family Istiophoridae), dolphinfish (*Coryphaena hippurus*), Pacific herring (*Clupea pallasi*), jack mackerel (*Trachurus symmetricus*), Pacific mackerel (*Scomber japonicus*), salmon (*Oncorhynchus spp*.), Pacific sardine (*Sardinops sagax*), blue shark (*Prionace glauca*), salmon shark (*Lamna ditropis*), shortfin mako shark (*Isurus oxyrinchus*), thresher sharks (*Alopias spp*.), swordfish (*Xiphias gladius*), tunas (family Scombridae), and yellowtail (*Seriola lalandi*).

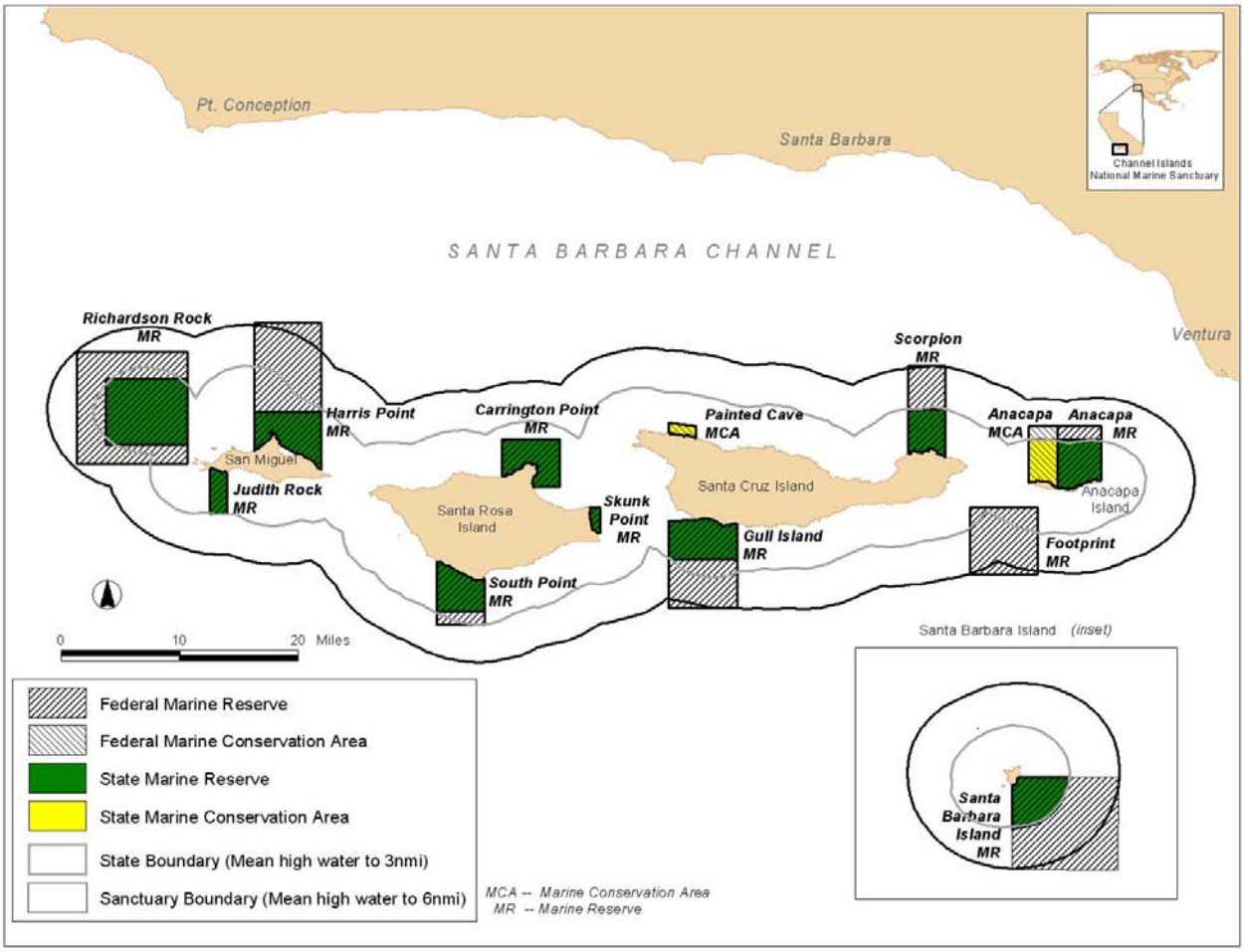
Regardless of the specific regulatory mechanism, however, the intended result of this alternative is for all extractive activities to be prohibited within the proposed marine reserves, and for extractive activities within the marine conservation area to be limited to those allowed in the regulation. For the precise regulatory language applicable to marine reserves and marine conservation areas, refer to the NMSP's proposed rule for this action (see Appendix A).

In Alternative 1a, the boundaries of the proposed marine zone (and their corresponding regulations) would apply from mean high water of the Islands to the seaward boundary of the proposed zones; thus, Sanctuary regulations would apply to both State and Federal waters. To implement this alternative, the NMSP would need to amend the CINMS designation document to:

- allow for the regulation of fishing and other extractive activities in marine reserves and marine conservation areas;
- allow for the regulation of possession of fishing gear in marine reserves and conservation areas; and
- modify the outer boundary of the CINMS to accommodate the proposed Harris Point, Gull Island, Footprint and Santa Barbara Island marine reserves, which were drawn with straight lines of latitude and longitude and, as a result, extend slightly outside the current Sanctuary boundary.

For the precise proposed changes to the CINMS designation document, refer to the preamble to the NMSP's proposed rule.

Figure 4 Alternative 1a



3.2.3 Alternative 1b

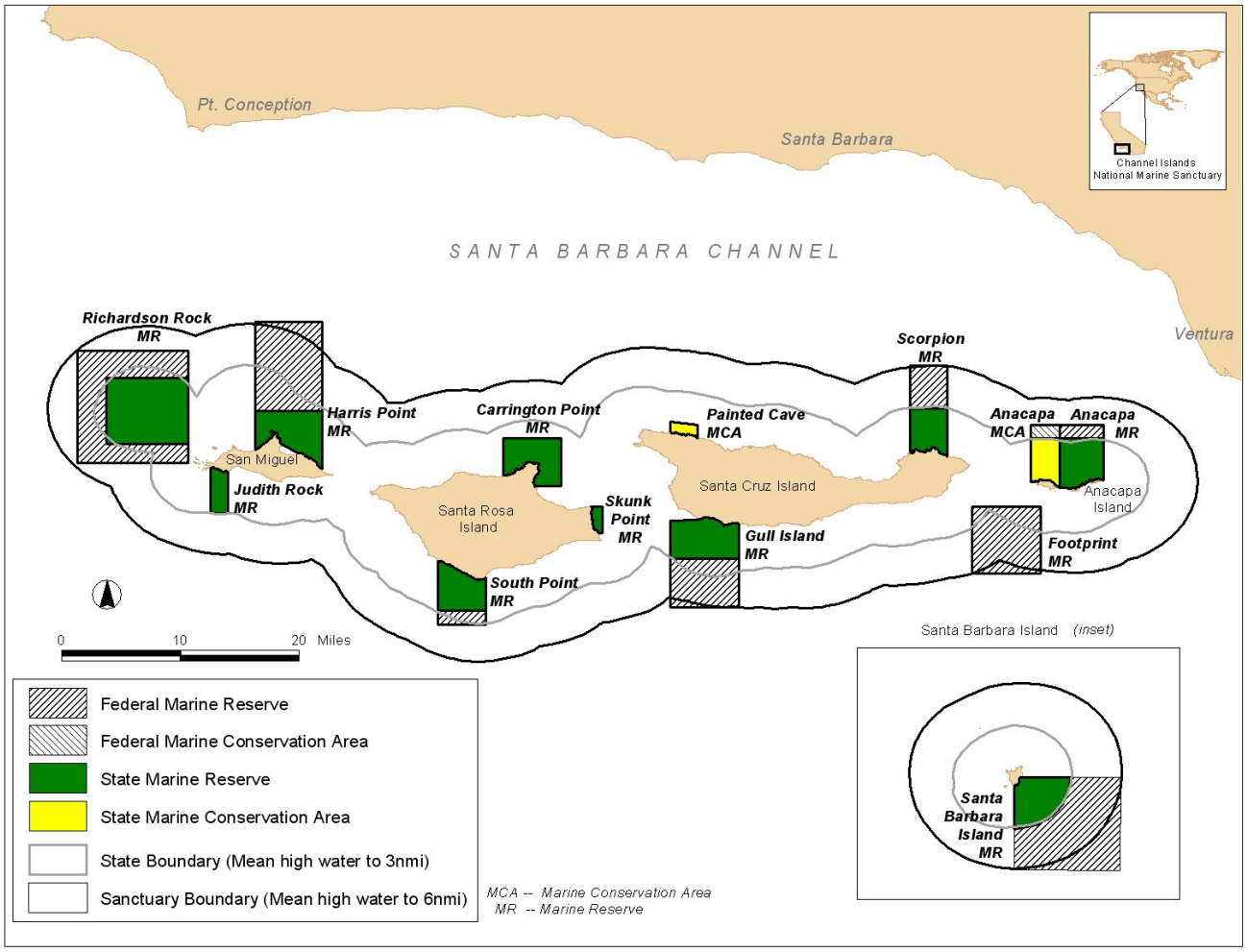
The marine zones proposed for Federal waters in Alternative 1b are identical in size to those in Alternative 1a. As such, Alternative 1b would add nine new marine zones, eight of which are no-take marine reserves and one limited take marine conservation area. A total of 138 nmi^2 would be added as marine reserves and 1.7 nmi^2 as marine conservation area (these totals include additional State waters zones). For a description of the various ecological attributes of Alternative 1b, see Section 3.3. Alternative 1b is shown in Figure 5.

In Alternative 1b, however, the boundaries of the proposed marine zones (and their corresponding regulations) would abut the existing State marine zone boundaries, including a small portion of State waters. Because it would create a distinction between marine zones proposed by NOAA and those adopted by the State of California, Alternative 1b would likely

create challenges for several important aspects of managing the marine zone network, such as enforcement, monitoring, and education. It is anticipated that this issue would be exacerbated in the parts of State waters where the existing State marine zones end and the new Federal marine zones begin. Please see Section 5.3.2 for a thorough analysis of the enforcement, monitoring and education implications of this alternative.

The intent of the regulations described for Alternative 1a in Section 3.2.2 above, is the same for Alternative 1b. However, the regulations would apply in Federal waters and in the portions of State waters required in order to abut the existing State marine zones.

Figure 5 Alternative 1b



3.2.4 Alternative 1c

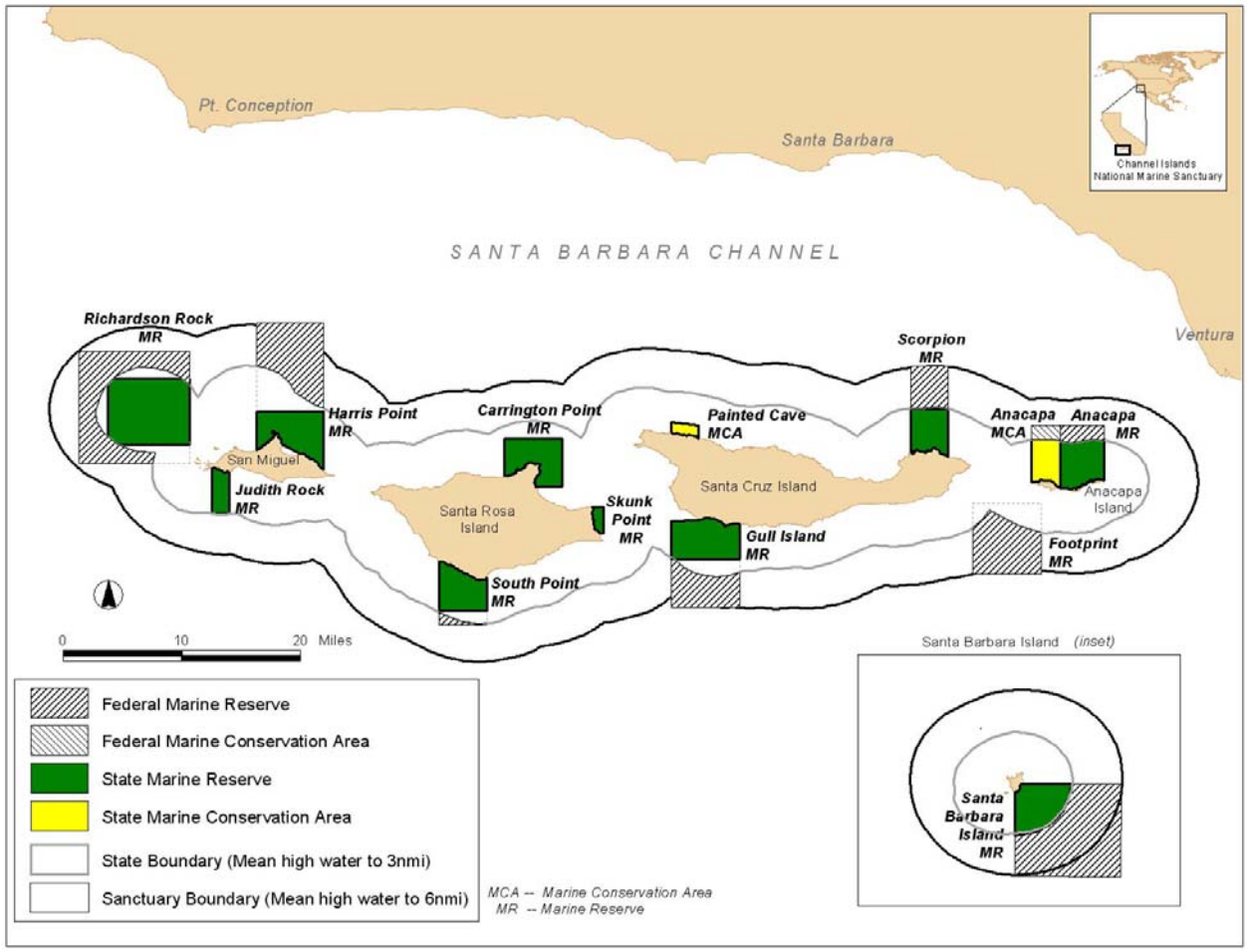
In Alternative 1c, the boundaries of the proposed marine zones would terminate at the existing State-Federal waters boundary (3 nmi from shore). Alternative 1c would add nine new marine zones, eight of which are no-take marine reserves and one limited take marine conservation area. A total of 111 nmi^2 would be added as marine reserves and 1.8 nmi^2 as marine conservation area. For a description of the various ecological attributes of Alternative 1c, see Section 3.3 Alternative 1c is shown in Figure 6.

Because most of the existing State marine zones do not extend all the way to State-Federal waters boundary, Alternative 1c would result in gaps of unprotected waters between most of the proposed Federal marine zones and the existing State marine zones. Because of the

jurisdictional separation in Alternative 1c, such gaps would hamper cooperative efforts by NOAA and the State of California in managing the marine zone network.

The intent of the regulations described for Alternative 1a in Section 3.2.2 above, is the same for Alternative 1c. However, the regulations would apply only in the Federal waters of the Sanctuary.

Figure 6 Alternative 1c



3.2.5 Alternative 2

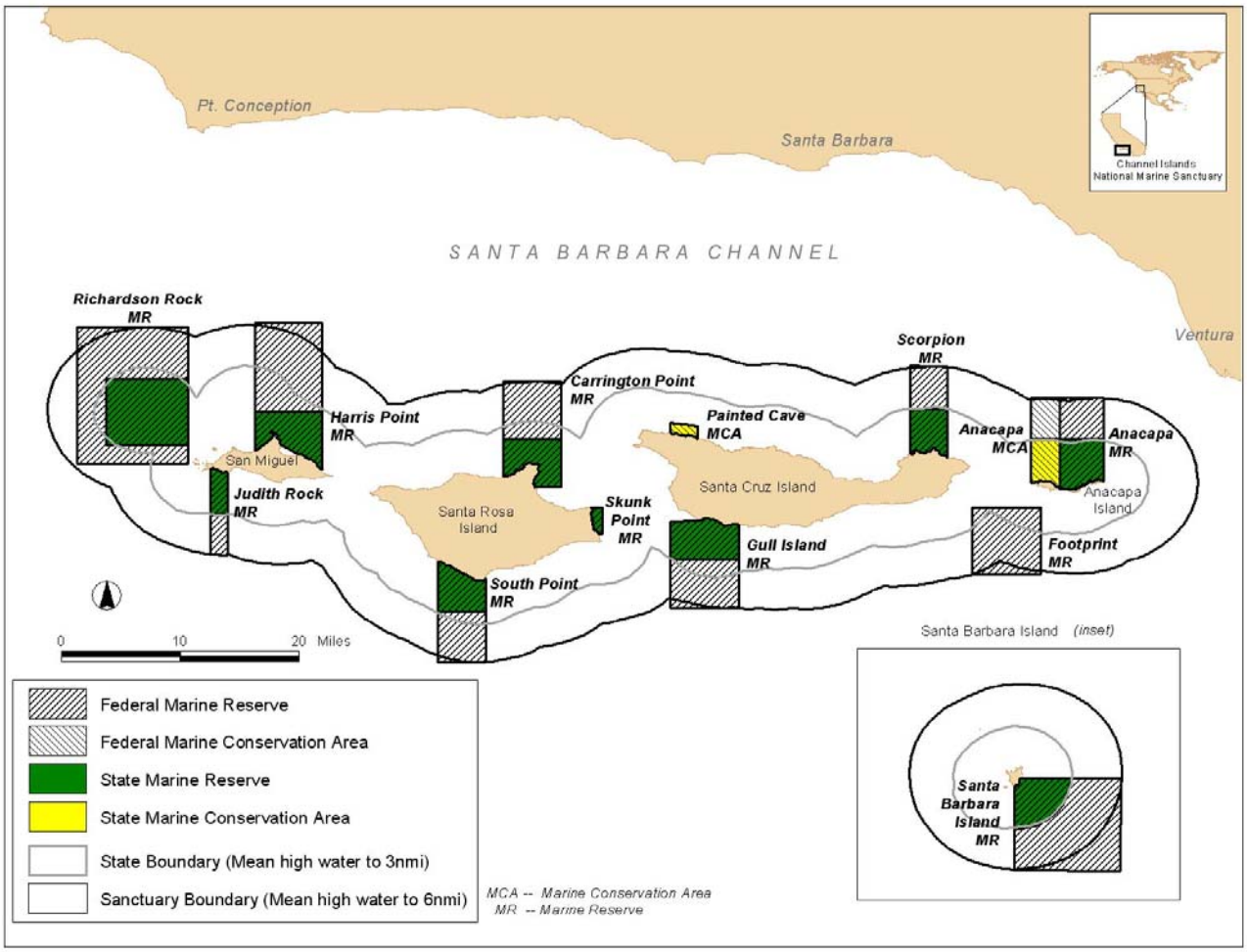
Alternative 2 is based on a network of marine reserves developed during the MRWG process (Alternative 5 in the CDFG 2002) with slight modifications to conform to the boundaries of the existing State marine reserves and conservation areas (Figure 7). Alternative 2 is the largest of the alternatives proposed, thereby increasing protection of various habitats and species of interest, as compared to Alternative 1a. When compared to Alternative 1a, Alternative 2 adds two new marine reserves (Carrington Point and Judith Rock), extends the size of three marine reserves (Anacapa Island, Richardson Rock, and South Point), and extends the size of the marine conservation area off of Anacapa Island. When compared to the no-action alternative, Alternative 2, adds 11 new marine reserves and one new marine conservation area. An additional 182 nmi^2 of marine reserves and 5.2 nmi^2 of marine conservation area is provided by Alternative 2 (including additional State waters zones).

Alternative 2 would have the same regulations as Alternative 1a (see section 3.2.2).

To implement this alternative, the NMSP would need to amend the CINMS designation document to:

- allow for the regulation of fishing and other extractive activities in marine reserves and marine conservation areas;
- allow for the regulation of possession of fishing gear in marine reserves and conservation areas; and
- modify the outer boundary of the CINMS to accommodate the proposed Richardson Rock, Harris Point, Carrington Pt., South Pt., Gull Island, Scorpion, Footprint, Anacapa marine reserve and conservation areas, and Santa Barbara Island marine reserves, which were drawn with straight lines of latitude and longitude and, as a result, extend outside the current boundary.

Figure 7 Alternative 2



3.2.6 Alternatives Considered But Rejected

A group of regional commercial fishermen submitted an alternative proposing new limited-take marine conservation areas and harvest controls to supplement the existing State marine zones (Figure 8). They requested this alternative be implemented under the MSA and applicable State authorities. Specifically, this approach recommended two additions to the State marine zones at Gull Island on the south side of Santa Cruz Island and the Footprint between Anacapa and Santa Cruz Islands. These proposed areas would allow all legally sanctioned pelagic fishing, spot prawn trapping, white sea bass fishing and squid fishing. Any gear that targets rockfish would not be allowed.

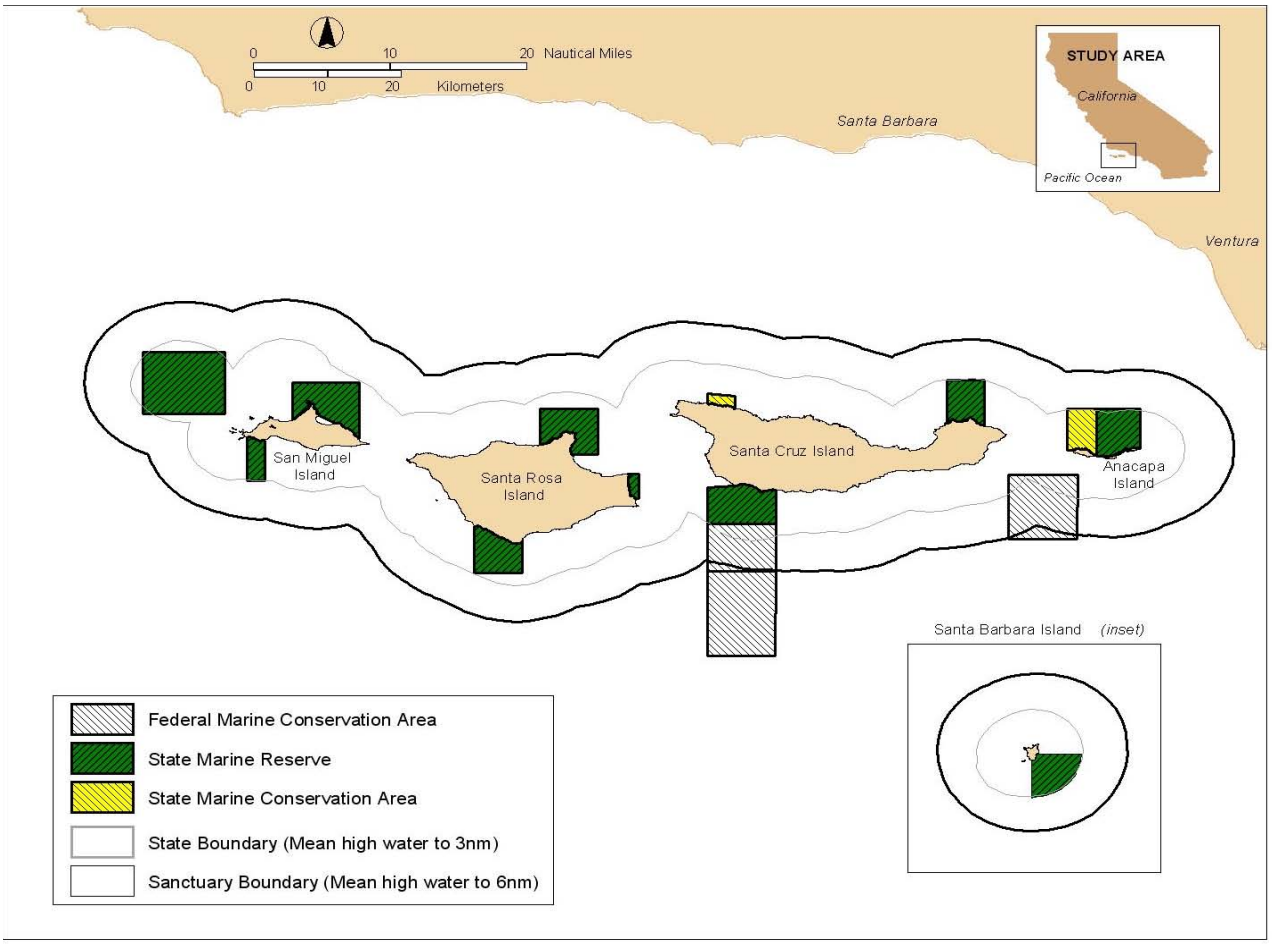
This alternative would add an additional 69.6 nmi^2 of marine conservation areas to the existing State marine zones for a total of 164.6 nmi^2 of the CINMS. Note that the proposed Gull Island conservation area would extend approximately 30.8 nmi^2 outside the current CINMS boundary.

The fishermen included as part of their proposed alternative, a request that the PFMC rename the Cowcod Conservation Area the "Cowcod Conservation Marine Protected Area" and the Rockfish Conservation Area the "Rockfish Conservation Marine Protected Area." This alternative would add marine conservation areas in soft and hard sediment habitat of deeper waters (below 100 m depth) including submarine canyon habitat.

This alternative is being rejected from inclusion in this DEIS for the following reasons:

- First, because this alternative does not adequately or completely protect a full range of habitats and populations in the CINMS, it does not satisfy the purposes and goals Stated in Section 2.0 or the six ecological criteria detailed in Section 3.3 of this DEIS.
- Second, this alternative was proposed to be implemented under the MSA and not the NMSA. Thus, it would not require any action by the NMSP and is not appreciably different than the No Action Alternative (Section 3.2.1).

Figure 8 Fishermen's Alternative



3.3 Comparison of Alternatives

Six ecological criteria, detailed below, provide the scientific framework for comparing the alternatives and provide further context for a description of each alternative. A longer discussion of the ecological criteria is included in the CEQA document (CDFG 2002). Table 1 shows the six ecological criteria and a summary of their application to the project location**.** The list was developed by the Science Advisory Panel during the MRWG process and is used here to compare alternatives. Unless otherwise noted, references to Alternative 1 in the descriptions below refer to Alternatives 1a, 1b, and 1c.

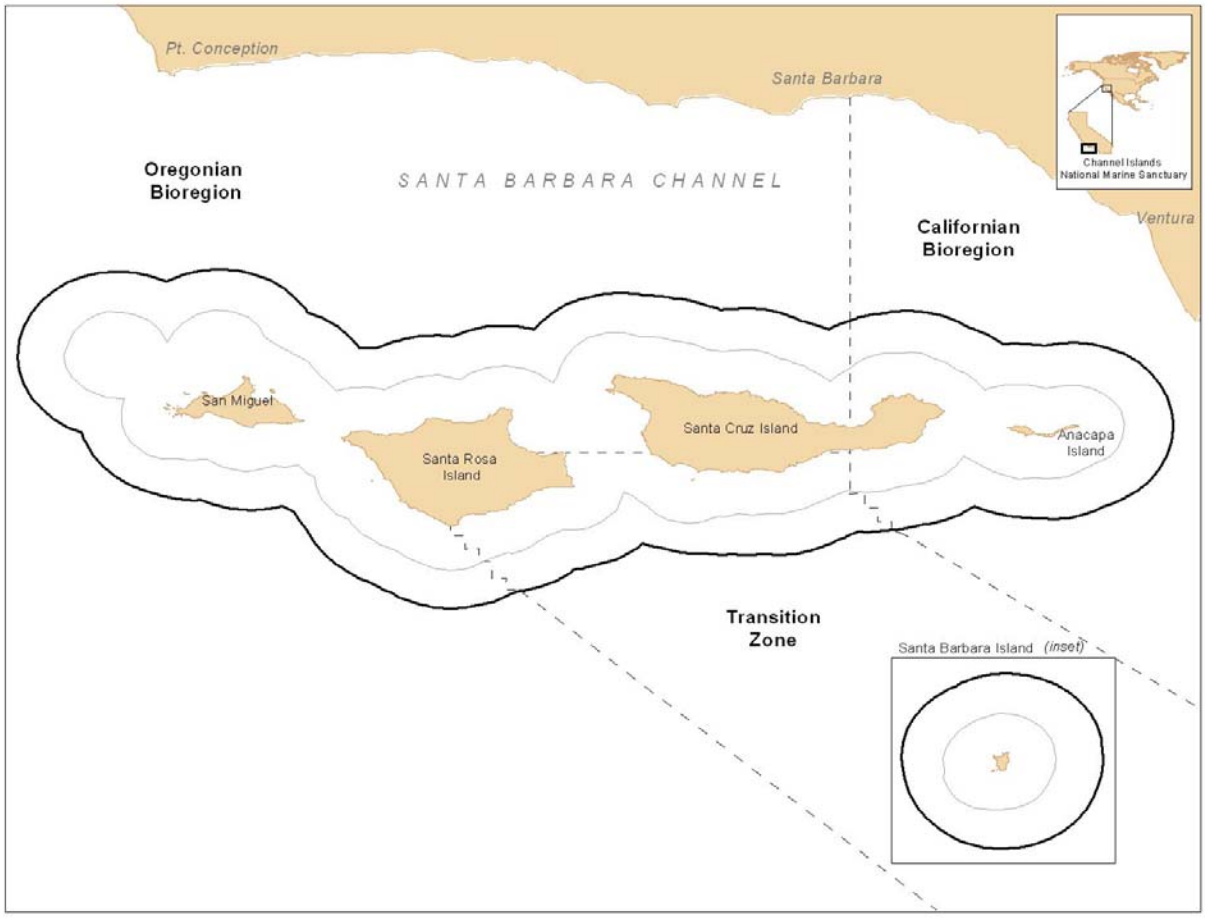
Table 1 Ecological Criteria that Contribute to Biodiversity Conservation in MPA Planning

	Ecological Criteria	**Application to the Channel Islands**
1	Biogeographic representation	Three major biogeographical regions were identified using data on biota and Sea Surface Temperature (SST).
2	Habitat representation	Representative and unique marine habitats in each biogeographical region were classified using depth, substrate type, and a variety of additional features.
3	Habitat replication	At least one, and no more than four, zones should be placed in each of the three biogeographical regions. By way of example, in one region (650 nmi^2), 2-3 zones (~60-160 nmi^2 each) were recommended.
4	Species of Interest	MRWG identified 119 species of commercial, recreational and ecological importance for special consideration.
5	Size	Individual zones would accommodate species' home ranges.
6	Connectivity	Zones should be spaced no more than 50-100 km apart to facilitate larval and adult exchange between zones.

3.3.1 Criterion 1: Biogeographic Representation

Biogeographic regions are distinct areas characterized by differences in the assemblages of species present. In the Channel Islands region, there are two distinct biogeographic regions and a unique transition zone between them (Figure 9). The Oregonian Province is characterized by the cold waters of the California Current and encompasses San Miguel Island, Santa Rosa Island, and the northwest side of Santa Cruz Island. It extends northward along the coast of California, Oregon, and Washington. The Californian Province is characterized by warm water of the California Counter current and extends south along the coast of California and Mexico. Species characteristic of the Californian Province occur around Anacapa Island and the east end of Santa Cruz Island. The transition between the two biogeographic regions, which is characterized by mixed water from both biogeographic regions, supports a unique assemblage of species characteristic of south Santa Rosa and Santa Cruz Islands and Santa Barbara Island.

Figure 9 Biogeographic Regions and Transition Zone within the Study Area



Each of the alternatives incorporates the existing State marine zones, which span the three biogeographic regions found in the CINMS. Five marine reserves and one marine conservation area are located in the Oregonian biogeographic region, two marine reserves and one marine conservation area are located in the Californian biogeographic region, and three marine reserves are located in the transition zone between the two biogeographic regions mostly within nearshore waters. The marine zones proposed in Alternative 1expand the existing protection to deeper water marine habitats in all of the biogeographic regions in the project area. Three marine reserves are proposed in deep water within the Oregonian biogeographic region: (1) around Richardson Rock, to the west of the Channel Islands, (2) north of San Miguel Island, and (3) south of Santa Rosa Island. Three marine reserves and one marine conservation area are proposed for deep waters of the Californian biogeographic region: (1) one small marine reserve north of Anacapa Island, (2) one small marine conservation area north of Anacapa Island, (3) one marine reserve on the northeast side of Santa Cruz Island, and (4) one marine reserve around the

Footprint region, between and south of the passage between Santa Cruz and Anacapa Islands. The marine reserve around the Footprint region is a significant addition to the protection within the Californian biogeographic region. Two additional marine reserves are proposed in the transition region: (1) one marine reserve over the Santa Cruz submarine canyon south of Santa Cruz Island, and (2) one marine reserve encompassing the deep water habitats to the southeast of Santa Barbara Island. Alternative 1 provides substantial protection, with the potential to achieve goals for restoration of marine habitats and species of interest, in deep-water habitats in all biogeographic regions. One limitation of Alternative 1 is the absence of marine zones in deep-water habitats around Santa Rosa Island.

The marine zones proposed in Alternative 2 encompass those proposed in Alternative 1. The primary difference between the alternatives, in terms of biogeographic representation, is that Alternative 2 includes substantially more protection for the Oregonian biogeographic region and some additional protection for the Californian biogeographic region. In the Oregonian region, Alternative 2 includes three important differences from Alternative 1: (1) one marine reserve is proposed in deep water north of Santa Rosa Island, (2) one marine reserve is proposed in deep water south of San Miguel Island, and (3) a substantially larger marine reserve is proposed for the region south of Santa Rosa Island. In the Californian biogeographic region, there are two important differences between the alternatives: A substantially larger marine reserve and a substantially larger marine conservation area are proposed north of Anacapa Island. The biogeographic provinces are thus better represented in Alternative 2 than in Alternative 1. Although both alternatives contribute toward the Sanctuary's goals, Alternative 2 would contribute more to (1) restoring and enhancing the abundance, density, population age structure and diversity of the natural biological communities in all biogeographic regions, and (2) protecting, restoring, and maintaining functional and intact portions of natural habitats, (including deeper water habitats), populations, and ecological processes in all biogeographic regions within the Sanctuary.

3.3.2 Criterion 2: Habitat Representation

One of the NMSP's goals is to protect, restore, and maintain functional and intact portions of natural habitats, populations, and ecological processes in the CINMS. Marine reserves are effective tools because they limit or prohibit extraction of natural resources. Marine reserves reduce, or in some cases eliminate, potential human disturbances to marine habitats, including the direct impacts of fishing gear, loss and entanglement of fishing gear, and deliberate or unintentional disturbance by divers, such as stirring up sediments and damaging or otherwise disturbing sensitive animal and plant species.

In order to protect a broad array of marine species and their ecological interactions, all representative habitat types should be protected. Because species depend on habitats for survival, growth and reproduction, protecting representative marine habitats helps achieve the NMSP's goal of restoring and enhancing the abundance, density, population age structure, and

diversity of the natural biological communities. Marine habitats are important places where marine animals and plants live, grow and reproduce. Each habitat type is associated with an assemblage of different marine species. Habitats associated with species of interest are listed in Appendix G. Many species use several different habitat types during their life cycles. It is common for individuals to use different habitat types at different stages of their life cycles. For example, larvae may drift in the water column, juveniles may settle into shallow water, and adults may inhabit deeper water. In some cases, individuals use several different habitat types during one stage of their life cycle. Species thrive and become abundant in suitable habitats that are protected from structural damage, pollution, and other disturbances.

The SAP defined marine habitats according to the characteristics that exert strong influences on Sanctuary ecology. The SAP identified important differences between soft sediments (including mud, sand, gravel and shell) and hard sediments (including boulder, rocky reef and bedrock). For each of these sediment types, four major depth intervals were identified based on ecological characteristics: euphotic zone (0-30 m), shallow continental shelf (30-100 m), deep continental shelf (100-200 m), and the continental slope (>200 m).

The existing State marine zones include a variety of habitats in the shallow subtidal region around the northern Channel Islands (Table 2). Most of the area within the existing State marine zones is in the highly productive euphotic zone (0-30 m depth) and on the shallow continental shelf (30-100 m depth). The deep-water habitats of the Sanctuary are not well represented in the existing State marine zones, including any substantial protection for habitats on the deep continental shelf or slope in any of the biogeographic regions, except a portion of the submarine canyon south of Santa Cruz Island.

Table 2 Marine Habitats Represented in Existing State Marine Zones

Habitats	Existing State MR	Existing State MCA	Total[1]
Total Area (nmi^2)	95.2	6.9	102.1
Soft sediment (0-30 m depth)	5.7	0.1	5.8
[2]Medium sediment (0-30 m depth)	0.1	0.1	0.2
Hard sediment (0-30 m depth)	7.6	0.2	7.7
Soft sediment (30-100 m depth)	18.9	4.7	23.6
[2]Medium sediment (30-100 m depth)	0.1	0.1	0.2
Hard sediment (30-100 m depth)	7.5	0.2	7.7
Soft sediment (100-200 m depth)	9.0	0.1	9.1

Habitats	Existing State MR	Existing State MCA	Total[1]
[2]Medium sediment (100-200 m depth)	0.1	0.1	0.2
Hard sediment (100-200 m depth)	0.2	0.0	0.2
Soft sediment (>200 m depth)	11.2	0.0	11.2
Hard sediment (>200 m)	0.4	0.0	0.4
Submarine canyon	5.8	0	5.8
Unclassified sediments	28.6	1.3	29.9
Kelp			5.1
Surfgrass			6.4
Eelgrass			0.2

[1]Cumulative representation of the existing State zones
[2]Estimated in Anacapa State MR and State MCA from side scan sonar data gathered by Guy Cochrane (USGS).

Table 3 provides a description of the habitat types in existing State marine zones and within additional areas proposed for Alternatives 1 and 2.

Table 3 Description of Habitat Types in Existing and Proposed Marine Zones

Zone	Habitat Types in Existing State Marine Zones	Habitat Types in Alternative 1	Habitat Types in Alternative 2
Anacapa Island MCA	Soft and unconsolidated sediment; rocks and boulders distributed throughout the region	Low relief shell ridges on consolidated mud, sand, and gravel shelf	Low relief shell ridges on consolidated mud, sand, and gravel shelf
Anacapa Island MR	Numerous small rocky reefs and shell ridges distributed throughout the region of consolidated mud, sand, gravel and shell	Low relief shell ridges on consolidated mud, sand, and gravel shelf	Low relief shell ridges on consolidated mud, sand, and gravel shelf
Carrington Point MR	Mixed sand and rock habitat, including numerous submerged rocky ridges.	No addition proposed	Medium to high relief rocky reefs at 180 - 240 ft, unconsolidated mud, sand and gravel on continental shelf and slope
Footprint MR	No existing zone	Submerged rocky feature that is characterized by boulder and cobble at 230-300 m	Submerged rocky feature that is characterized by boulder and cobble at 230-300 m
Gull Island MR	Mixed sand and rocky reefs	Offshore and south of Morris Point, mixed sand and medium relief rocky reef; steep wall of Santa Cruz Submarine Canyon	Offshore and south of Morris Point, mixed sand and medium relief rocky reef; steep wall of Santa Cruz Submarine Canyon
Harris Point MR	Expansive rocky bottom mixed with sand	Area southeast of Wilson Rock likely rocky between 45 – 200 ft.; steep continental slope	Area southeast of Wilson Rock likely rocky between 45 – 200 ft.; steep continental slope
Judith Rock MR	Mixed rock and sand with moderate relief	No addition proposed	Unconsolidated mud, sand and gravel
Richardson Rock MR	Mixed sand and rock	High relief rocky habitat; 350 – 700 ft	High relief rocky habitat; 350 – 700 ft
Santa Barbara I. MR	Mixed sand and rocky reef	High relief deep continental shelf and slope	High relief deep continental shelf and slope
Scorpion MR	Unconsolidated mud, sand and gravel; possible submerged rocky outcrops and pinnacles	Unconsolidated mud, sand and gravel; possible submerged rocky outcrops and pinnacles	Unconsolidated mud, sand and gravel; possible submerged rocky outcrops and pinnacles
South Point MR	Mixed rocky reef with sand; nearshore shelf drops off to sandy plateaus at approximately 70 ft; two deeper reefs occur at 90 and 120 ft	Unconsolidated mud, sand and gravel on the continental shelf and slope	Unconsolidated mud, sand and gravel on the continental shelf and slope; some mid-relief rocky substrate may be found on the offshore bank
Skunk Point MR	Unconsolidated sand with some scattered rocky ridges	No addition proposed	No addition proposed
Painted Cave MCA	Important cultural and natural feature	No addition proposed	No addition proposed

MR = marine reserve. MCA=marine conservation area. Primary source for existing marine zones: CDFG (2002); Primary source for proposed marine zones: Guy Cochrane (USGS), Merit McCrea (UCSB), Minerals Management Service (1987)

Alternative 1 includes a variety of different habitat types, including rocky reef, unconsolidated mud, sand and gravel, and submarine canyon (Table 4). Sixty percent (85.2 nmi^2) of the habitat proposed for protection in Alternative 1 (140.2 nmi^2) is classified as soft sediment on the continental slope (>200 m). Unconsolidated mud, sand, shell and gravel are found in the Scorpion Rock MR and North Anacapa MR and MCA. Submerged rocky features are located in the Richardson Rock MR, Harris Point MR, and the Footprint. The area within the South Point MR and Gull Island MR includes mixed sand and medium relief rocky substrate. The Gull Island MR also includes the steep walls of the Santa Cruz submarine canyon. High relief deep continental shelf and slope habitats are included in the Santa Barbara Island MR.

Soft sediment on the continental slope (>200 m) is well replicated in Alternative 1. This alternative includes 2 medium-sized patches and 5 large patches of soft sediment on the continental slope. Although there are 6 patches of soft sediment on the deep continental shelf (100-200 m), the patches are quite small (<1 nmi^2). Habitat patches of hard substrate within all depth intervals are not replicated sufficiently in Alternative 1. Whereas the SAP recommended 3-5 patches of each habitat type, Alternative 1 includes two or fewer replicates of hard substrate at all depths and most of the patches are small (<1 nmi^2).

Table 4 Proposed and Cumulative Habitat Representation for Alternative 1a

	Total New Proposed			Cumulative Total[2]
Habitats	**MR**	**MCA**	**Total New[1]**	
Total Area	138.5	1.7	140.2	242.3 nmi
Soft sediment total	88.2	1.4	89.6	139.3
Hard sediment total	3.0	-	3.1	19.2
Soft sediment (0-30 m)	-	-	-	5.8
[3]Medium sediment (0-30 m)	-	-	-	0.2
Hard sediment (0-30 m)	-	-	-	7.8
Soft sediment (30-100 m)	0.6	-	0.6	24.2
[3]Medium sediment (30-100 m)	-	-	-	0.2
Hard sediment (30-100 m)	-	-	0.3	8
Soft sediment (100-200 m)	2.8	1.1	3.8	12.9
[3]Medium sediment (100-200 m)	-	-	-	0.2
Hard sediment (100-200 m)	-	-	0.5	0.7
Soft sediment (>200 m)	84.9	0.3	85.2	96.4
Hard sediment (>200 m)	2.3	-	2.3	2.7

	Total New Proposed			Cumulative Total[2]
Habitats	**MR**	**MCA**	**Total New[1]**	
Submarine canyon	3.2	-	3.2	10
Unclassified sediments	43.0	0.3	43.3	73.2

[1] New proposed area that would complement the existing State marine zones (sum of "Additional Marine Conservation Area (MCA)" and "Marine Reserve (MR)".
[2] Cumulative representation of proposed area and the existing State marine zones
[3] Estimated in the Anacapa Island SMR and SMCA from side scan sonar data gathered and processed by Guy Cochrane (USGS).

Alternative 2 includes the habitats described in Alternative 1 with several important additions (Table 5). Alternative 2 is 47 nmi^2 larger than Alternative 1, with the primary differences at Carrington Point, Judith Rock, South Point, and Anacapa Island.

Unique features of Alternative 2 are:

- Medium to high relief rocky reefs and unconsolidated mud, sand and gravel in the Carrington Point MR;
- Greater area (+8.8 nmi^2) of low relief shell ridges on consolidated mud, sand and gravel on the deep continental shelf and slope habitat in the Anacapa Island MR and SMCA;
- Greater area (+8.0 nmi^2) of unconsolidated mud, sand, and gravel on the continental shelf and slope, some mid-relief rocky substrate on the offshore bank in the South Point MR; and
- Unconsolidated mud, sand and gravel habitats in the Judith Rock MR.

Table 5 Proposed and Cumulative Habitat Representation For Alternative 2(all units nmi^2)

	Total New Proposed			Cumulative Total[2]
Habitats (depth)	**MR**	**MCA**	**Total New [1]**	
Total Area	182	5.2	187.2	289.3
Soft sediment totals	104.4	4.9	109.4	159.1
Hard sediment totals	3.0	0.0	3.1	19.2
Soft sediment (0-30 m)	-	-	-	5.8
[3]Medium sediment (0-30 m)	-	-	-	0.2
Hard sediment (0-30 m)	-	-	-	7.8
Soft sediment (30-100 m)	1.2	-	1.2	24.8
[3]Medium sediment (30-100 m)	-	-	-	0.2
Hard sediment (30-100 m)	-	-	0.3	8
Soft sediment (100-200 m)	5.5	1.1	6.6	15.7

	Total New Proposed			Cumulative Total[2]
Habitats (depth)	**MR**	**MCA**	**Total New [1]**	
[3]Medium sediment (100-200 m)	-	-	-	0.2
Hard sediment (100-200 m)	-	-	0.5	0.7
Soft sediment (>200 m)	97.8	3.8	101.6	112.8
Hard sediment (>200 m)	2.3	-	2.3	2.7
Submarine canyon	4.2	0	4.2	10
Unclassified sediments	70.2	0.3	70.6	100.5

[1] New proposed area that would complement the existing State marine zones (sum of "Marine Conservation Area (MCA)" and "Marine Reserve (MR)")
[2] Cumulative representation of proposed area and the existing State marine zones
[3] Estimated in the Anacapa Island SMR and SMCA from side scan sonar data gathered and processed by Guy Cochrane (USGS).

Criterion 3: Habitat Replication

Replication of habitats in multiple marine reserves is needed to fulfill the NMSP's goals to (1) protect, restore, and maintain functional and intact portions of natural habitats, and (2) provide, for research and education, undisturbed reference areas that include the full spectrum of habitats within the Sanctuary. In order to ensure that the protected habitats are "functional" and "intact," a viable alternative must offer the lowest possible risk of disturbance to the protected habitats. An alternative with only one patch of any particular type of habitat would not necessarily fulfill the NMSP's goals because a single patch is more vulnerable to the adverse effects of natural and human disturbances than multiple patches. Unpredictable disturbances are certain to affect portions of the project area at different times (Allison *et al.* 2003). An alternative that protects multiple patches of the same type of habitat in multiple marine zones throughout the project area reduces the risk of simultaneous disturbance to all patches. The SAP recommended that each habitat type be protected within 3-5 replicate marine reserves.

Four major reasons for replication are:

- To provide stepping-stones for dispersal of marine species;
- To insure against local environmental disaster (e.g. oil spills or other catastrophes) that can significantly impact an individual, small marine reserve;
- To provide independent experimental replicates for scientific study of marine reserve effects; and
- To evaluate the effects of human influences on populations and communities outside marine reserves (use of marine reserves as reference sites).

Ideally, 3-5 replicates containing sufficient representation of each habitat type should be placed in the network within each biogeographical region and for each habitat to serve these goals. For large biogeographical regions, fulfilling the critical stepping stone role may require even more replicates.

In addition to its role for risk reduction, habitat replication is needed to provide sufficient information about each habitat and associated species to inform our understanding of the ecological consequences of the marine zones. The scientific method requires that scientists rely on statistical probability to describe and understand ecological processes. When marine reserves are established, scientists can monitor ecological processes within and around the marine zones to understand the ecological consequences of the zones. Observations from a single zone are not sufficient because the patterns observed may be attributed either to zonal effects or an array of other influences that are unique to the particular location. Observations from at least 3-5 marine reserves with similar biophysical features are needed to identify significant patterns and trends. With sufficient replication, the observed patterns and trends may be attributed to effects of the marine zones.

Estimates of the numbers and size classes of habitat patches in the proposed marine zones are listed in Table 6. Soft sediment on the deep continental slope and shelf are well replicated in Alternatives 1 and 2. Shallow marine habitats (<30 m) are not increased in the alternatives, but are already well represented in the existing State marine zones. Small patches (<1 nmi^2) of all habitat types (>30 m depth) are included in both alternatives. However, larger patches (>1 nmi^2) within the size range recommended by the SAP are not sufficiently replicated for most habitat types.

Soft sediment on the deep continental shelf (100-200 m) and slope (>200 m) is well replicated in marine zones in Alternative 2. This alternative includes 4 medium-sized patches of soft sediment on the deep continental shelf and 4 medium-sized patches and 7 large patches of soft sediment on the continental slope. Although there are 4 patches of soft sediment on the shallow continental shelf (30-100 m), the patches are quite small (<1 nmi^2). Habitat patches of hard substrates within all depth intervals are not replicated sufficiently in Alternative 2. Alternative 2 includes two or fewer replicates of hard substrate at all depths and most of the patches are small (<1 nmi^2). As noted above, data within the Richardson Rock MR and part of the Harris Point MR were unclassified (MMS 1987). Anecdotal data suggests additional hard substrate in Richardson Rock MR and Carrington Point MR (M. McRae, personal communication).

Alternative 2 differs from Alternative 1 on the following points:

- Additional (+1) small patch of soft sediment on the shallow continental shelf (30-100 m);
- Additional (+2) small and medium patches of soft sediment on the deep continental shelf (100-200 m);
- Additional (+4) medium and large patches of soft sediment on the continental slope (>200 m);

- Additional (+3) patches of unclassified sediment; and
- Additional rocky substrate in Carrington Point MR.

Alternative 2 includes all of the marine zones proposed in Alternatives 1a, 1b, and 1c and their potential ecological benefits. In addition, Alternative 2 includes the following unique biophysical characteristics:

- Medium to high relief rocky reefs in Carrington Point MR support numerous rockfish species, including bocaccio, vermilion, canary, yellowtail, and olive rockfish;
- Judith Rock MR includes various species of interest including sea cucumber, spot prawn, thornyhead, sablefish, sardine, anchovy, mackerel and thresher shark;
- Additional area (8.8 nmi^2) over the continental shelf and slope north of Anacapa Island supports benthic species, such as sea cucumber, ridgeback and spot prawns and halibut, and pelagic species such as squid, sardine, anchovy, mackerel, tunas, billfish, swordfish, and various sharks; and
- Additional area (8.0 nmi^2) south of Santa Rosa Island at South Point includes benthic species, such as sea cucumber, spot prawn, halibut, thornyhead, and sablefish, and pelagic species such as squid, white seabass, sardine, anchovy, mackerel, and thresher shark.

Table 6 Number and Size Class Of Habitat Patches in Proposed Marine Zones for Alternatives 1 and 2 (based on data from the Minerals Management Service, 1987)

	Patch Size Alternative 1			Patch Size Alternative 2		
Habitats Depths	**< 1 nmi^2**	**1-5 nmi^2**	**>5 nmi^2**	**< 1 nmi^2**	**1-5 nmi^2**	**>5 nmi^2**
Soft sediments (0-30 m)						
Soft sediments (30-100 m)	3			4		
Soft sediments (100-200 m)	6	1		5	4	
Soft sediments (> 200 m)	1	2	5		4	7
Hard sediments (0-30 m)						
Hard sediments (30-100 m)	2			2		
Hard sediments (100-200 m)	1			1		
Hard sediments (> 200)	1	1		1	1	
Unclassified sediments	2		2	1		4

3.3.3 Criterion 4: Species of Interest

One Stated goal of the proposed action is to restore and enhance the abundance, density, population age structure, and diversity of natural biological communities. Natural biological communities within the Sanctuary include a broad spectrum of different species with a variety of natural history characteristics. The abundance, density, and diversity of natural biological communities depend, in large part, on the availability of suitable habitats. The SAP recommended setting aside portions of representative marine habitats in order to protect the broad spectrum of species of interest.

The MRWG, with assistance from the SAP, identified species of particular interest (Appendix G). The list of 119 species of interest includes: (1) species of economic and recreational importance, (2) keystone or dominant species (Paine 1966, 1969; Power and Mills 1995, Power *et al.* 1996), (3) candidate, proposed, or species listed under the Endangered Species Act, (4) species that have exhibited long-term or rapid declines in harvest and/or size frequencies, (5) habitat-forming species, (6) indicator or sensitive species, and (7) important prey species. The list excludes species that are: (1) incidental (species only occasionally found in the CINMS), (2) at the edge of their range, or (3) highly migratory.

It is difficult to model ecological changes for species of interest in marine reserves, in part, because of complex ecological linkages within marine systems. However, sufficient information has been published to illustrate general trends for species abundance, size, biomass, and diversity in marine reserves.

The existing State marine zones protect a variety of species of interest, including marine algae, seagrasses, invertebrates, and fishes. Forests of giant kelp, which support numerous associated species, are protected within the North Anacapa Island SMR, Gull Island SMR, Carrington Point SMR, and South Point SMR. Other algae, including *Laminaria* and *Eisenia*, are found in the South Point SMR and Judith Rock SMR. Eelgrass and surfgrass beds, which serve important roles as nursery habitat for young invertebrates and fishes, are protected in North Anacapa Island SMCA, Scorpion SMR, Skunk Point SMR, and Carrington Point SMR. Mixed rocky reef and sand habitats protected in the North Anacapa Island SMR provide suitable habitat for California spiny lobster, California sheephead and black seabass. Red abalone, red and purple urchins have been observed in the mixed rock and sand habitats protected in the Harris Point SMR and South Point SMR. Sandy sea floor in the Skunk Point SMR, North Anacapa Island SMR and SMCA, and Scorpion Rock SMR is suitable habitat for halibut and other flatfishes. Breeding seabirds, including the endangered California Brown Pelican and the threatened Xantus's Murrelet, forage for small pelagic invertebrates and fishes in waters protected in the North Anacapa Island SMR and SMCA, and Santa Barbara Island SMR. Harris Point SMR also serves an important role to support breeding seabirds on Prince Island, which is entirely within the SMR, and the waters around the island offer a steady food supply for nesting birds. Overfished cowcod and endangered white abalone are protected within the Santa Barbara Island SMR and the Cowcod

Conservation Area. Marine mammals commonly haul out onshore at Painted Cave SMCA, Harris Point SMR, Judith Rock SMR, and Santa Barbara SMR. The variety of habitat types and associated species in State marine zones generally provide a broad representation of the biodiversity of the northern Channel Islands (J. Caselle, personal communication).

The proposed extensions of the State marine zones into deeper waters (Alternatives 1 and 2) have the potential to protect, restore and enhance populations of key species of interest. Potential contributions to biodiversity conservation are the proposed marine reserves at Richardson Rock, Harris Point, Gull Island, the Footprint, and Santa Barbara Island. Medium to high relief rocky reefs in Richardson Rock MR support numerous groundfish species, including yellowtail, olive, and vermilion rockfish and lingcod. Because of the distance to port and the frequent foul weather in the vicinity of Richardson Rock, these groundfish populations have not been subjected to intense fishing pressure. Richardson Rock therefore provides an opportunity to protect a relatively intact natural biological community. The open waters north of Harris Point are important feeding grounds for marine mammals that haul out on the shores of San Miguel Island and breeding seabirds on Prince Island. During the breeding season, radio-tagged Cassin's Auklets concentrated their feeding efforts on krill and small pelagic fishes in the open waters north of Harris Point (Adams 2003). The submerged rocky reefs around Gull Island provide another important opportunity to protect and restore depleted populations of abalone and various rockfish species, including blue and vermilion rockfish, and bocaccio. Many individual rockfish observed in the vicinity of Gull Island are the 5-year class from an important recruitment event in 1999 (M. McRae, personal communication).

3.3.4 Criterion 5: Size[12]

Size of both the individual zones and the overall network is an important consideration in order to achieve the NMSP's goals to: (1) protect, restore and enhance the abundance, density, population age structure and diversity of the natural biological communities, and (2) provide undisturbed reference areas where local populations exhibit a more natural abundance, density, diversity, and age structure. To provide any significant protection for a species of interest, the size of individual zones must be large enough to encompass the typical movements of many individuals.

Alternative 1 adds to the existing State marine zones 140.2 nmi^2 in 8 marine reserves and 1 marine conservation area (Table 7). The individual sizes of marine reserves range from 2.7 nmi^2 at Anacapa Island MR to 33.1 nmi^2 at Richardson Rock and the average area of individual reserves is 17.3 nmi^2. The average width (short axis) across marine zones in Alternative 1 is 3.1 nmi^2 with a range of 1.0 nmi^2 at Anacapa Island MR and MCA to 6.8 nmi^2 at Richardson Rock MR (Table 7). The proposed reserve at Richardson Rock is within the optimal range (5.4-10.8

12 Background text for "MPA Size" excerpted from the Master Plan Framework for the California Marine Life Protection Act Initiative adopted by the California Fish and Game Commission on August 22, 2005. http://www.dfg.ca.gov/mrd/mlpa/pdfs/mpf082205.pdf

nmi^2); four reserves, including the Footprint, Gull Island, Harris Point, and Santa Barbara Island, are within the recommended range (2.7-5.4 nmi^2); and four marine zones, including South Point MR, Scorpion MR, and Anacapa MR and MCA are below the recommended range. The regions north and west of San Miguel Island, southwest of Santa Cruz Island, around the Footprint region, and southeast of Santa Barbara Island are well represented in marine zones. The regions around Santa Rosa Island, and on the north sides of Santa Cruz and Anacapa Islands, are not well represented in marine zones. With one exception at the Anacapa Island MCA, the length (long axis) of marine zones proposed in Alternative 1 is consistent with the guidelines provided by the California Marine Life Protection Act Science Advisory Team.

Alternative 2 adds to the existing State marine zones 187.3 nmi^2 in 10 marine reserves and 1 marine conservation area (Table 7). The individual sizes of marine reserves in Alternative 2 range from 3.2 nmi^2 at Judith Rock MR to 43.3 nmi^2 at Richardson Rock MR and the average area of individual reserves is 18.2 nmi^2.

Alternative 2 includes all of the area in Alternative 1 and the following unique features:

- Carrington Point MR (14.7 nmi^2)
- Judith Rock MR (3.2 nmi^2)
- Additional area (12.2 nmi^2) in Richardson Rock MR
- Additional area (8 nmi^2) in South Point MR
- Additional area (5.3 nmi^2) in the Anacapa Islands MR
- Additional area (3.5 nmi^2) in the Anacapa Island MCA

Table 7 Comparison of Alternatives by Size (nmi^2)

Name	No Action (existing State zones)	Alternative 1a/1b			Alternative 2		Total Additional Waters
		Add'l State Waters	Federal waters	Total	Add'l State Waters	Federal waters	
Anacapa Island SMCA	5.54		1.7	1.7		5.2	5.2
Anacapa Island SMR	8.91		2.7	2.7		8.0	8.0
Carrington Point SMR	9.63				4.3	10.4	14.7
Footprint SMR		4.8	15.5	20.3	4.8	15.5	20.3
Gull Island SMR	11.58	4.1	10.8	14.9	4.1	10.8	14.9
Harris Point SMR	11.47	8.0	18.4	26.4	8.0	18.4	26.4
Judith Rock SMR	3.46					3.2	3.2
Richardson Rock SMR	23.92	8.8	22.3	31.1	8.8	34.6	43.3
Santa Barbara Island SMR	9.77	0.2	32.9	33.1	0.2	32.9	33.1
Scorpion SMR	7.03	0.3	6.7	7.1	0.3	6.7	7.1
South Point SMR	8.38	2.1	0.8	2.9	2.1	8.8	10.9
Skunk Point SMR	1.06						
Painted Cave SMCA	1.35						
Min Area MRs	3.5	0.2	0.8	2.7	0.2	3.2	3.2
Max Area MRs	23.9	8.8	32.9	33.1	8.8	34.6	43.3
Avg Area MRs	10.5	4.0	13.8	17.3	4.1	14.9	18.2
Avg Area MCAs	2.7		1.7	1.7		5.2	5.2
Total Area MRs	94.2	28.3	110.2	138.5	32.6	149.4	182.0
Total Area MCAs	8.0		1.7	1.7		5.2	5.2
Total Area marine zones	102.1	28.3	111.9	140.2	32.6	154.6	187.3

MR = Marine Reserve, MCA = Marine Conservation Area
The proposed action includes additional area in State and Federal waters. Area estimated in a Geographic Information System with files projected in UTM11, NAD83. Units are square nautical miles (nmi^2).

Movement patterns vary greatly among species. Some are completely immobile or move only a few meters. Others forage widely. The more mobile the individuals, the larger the individual zone must be to afford protection. Therefore, minimum zone size constraints are set by the more mobile species of interest. Because some of California's coastal species are known to move hundreds of miles, marine zones of any modest size are unlikely to provide complete protection for those species.

Individual adult home range sizes must be combined with knowledge of how individuals are distributed relative to one another (e.g., in exclusive versus overlapping neighborhoods) to determine how many individuals will be protected within a specific marine zone design. Tagging studies indicate that net movements of many of California's nearshore bottom-dwelling fish species, particularly reef-associated species, are on the order of 5-20 km (2.7-10.8 nmi^2) or less over the course of a year. Current data suggest that marine zones spanning less than about 5-10 km (2.7-5.4 nmi^2) in width may leave many individuals of important species poorly protected. Larger marine zones, spanning 10-20 km (5.4-10.8 nmi^2) of coastline, are probably a better choice given current data on adult fish movement patterns. Even with marine zones of this larger size, pelagic species with very large home ranges will likely receive little protection unless the network as a whole affords significant reductions in mortality during the cumulative periods that individuals spend in different marine zones, or unless other ecological benefits are conferred (e.g., protection of feeding grounds, reduction in bycatch). Table 7 shows the size of the existing State marine zones and the size of the proposed zones under alternatives 1 and 2. Table 8 shows the number of proposed zones that fall above, within or below the guidelines for zonal width along the zones short and long axes.

Less is known about the net movements of most of the deeper water benthic and pelagic fishes, especially those associated with soft-bottom habitat, but it is reasonable to suspect that the range of movements will be similar or greater than those of nearshore species. One cause of migration in demersal fishes is the changing resource/habitat requirements of individuals as they grow. Thus, individual ranges encompass the movement of an individual among habitats throughout its lifetime. Marine zones that include several different and adjacent habitat types will more likely protect an individual over its lifetime. Some species also move between shallow and deeper habitat, and, therefore, marine zones that extend offshore are more likely to accommodate such movement and protect these individuals.

The average width (short axis) across marine zones in Alternative 2 is 3.3 nmi with a range from 1.1 nmi at Judith Rock MR to 6.8 nmi at Richardson Rock MR (Figure 10). The proposed reserve at Richardson Rock is within the optimal range (5.4-10.8 nmi); six reserves, including the Carrington Point, Footprint, Gull Island, Harris Point, Santa Barbara Island, and South Point, are within the recommended range (2.7-5.4 nmi); and four marine zones, including Judith Rock MR, Scorpion MR, and Anacapa MR and MCA are below the recommended range. The length (long axis) of marine zones proposed in Alternative 2 is fully within the guidelines provided by

the Science Advisory Team. Alternative 2 provides representation of all regions throughout the northern Channel Islands with the exception of northwest Santa Rosa Island.

Key differences between Alternative 2 and Alternative 1 are:

- Proposed reserve at Carrington Point in Alternative 2 is within the recommended range of zone widths;
- Additional area at South Point MR in Alternative 2 is within the recommended range of zone widths (2.7-5.4 nmi^2); and
- Proposed reserve at Judith Rock in Alternative 2 is below the recommended range of zone widths.

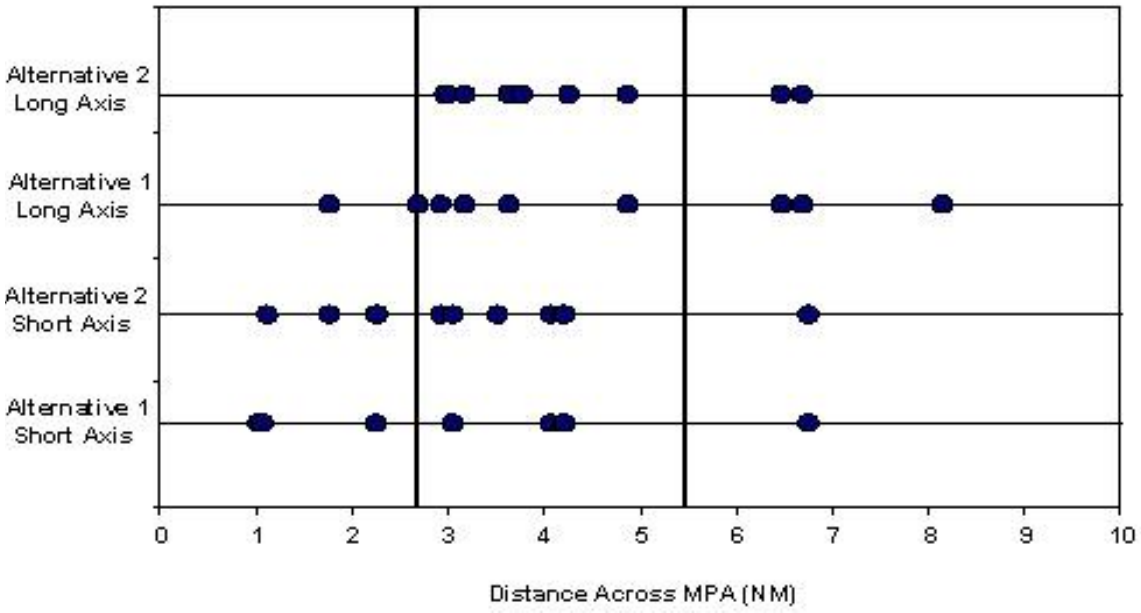
In summary, zonal widths above 10.8 nmi^2 are excellent for biodiversity conservation; 5.4-10.8 nmi^2 are good; 2.7-5.4 nmi^2 are fair; and widths below 2.7 nmi^2 are likely to be inadequate (Table 8).

Table 8 Number of Proposed Zones That Fall Above, Within or Below the Guidelines for Zonal Width along the Zones Short and Long Axes

	Alt 1 Short Axis	**Alt 2 Short Axis**	**Alt 1 Long Axis**	**Alt 2 Long Axis**
Below guidelines (<2.7 nmi^2)	4	4	1	0
Within guidelines (2.7-5.4 nmi^2)	4	6	5	8
Above guidelines (>5.4 nmi^2)	1	1	3	3

3.3.5 Criterion 6: Connectivity[13]

Figure 10 Distances Across the Short and Long Axes of Marine Zones in Alternatives 1 and 2



The exchange of larvae among marine reserves is a fundamental biological rationale for establishing marine reserve networks. Larval exchange has at least three primary objectives: to ensure that populations within marine reserves are not jeopardized by their reliance on replenishment from less protected populations outside marine zones; to ensure exchange and persistence of genetic traits of protected populations (e.g., fast growth, longevity); and to establish reference sites that support populations and communities within marine zones that are independent from those outside marine zones, to the extent possible. The objectives are consistent with the goals developed by the Sanctuary to (1) protect, restore and enhance the abundance, density, population age structure, and diversity of the natural biological communities, (2) protect, restore, and maintain functional and intact populations and ecological processes, and (3) provide undisturbed reference areas where local populations exhibit a more natural abundance, density, diversity, and age structure.

Movement out of, into and between marine zones by juveniles, larvae or spores of marine species depends on their dispersal distance. Important determinants of dispersal distance are the

[13] Background text for "MPA Spacing" excerpted from the Master Plan Framework for the California Marine Life Protection Act Initiative adopted by the California Fish and Game Commission on August 22, 2005. http://www.dfg.ca.gov/mrd/mlpa/pdfs/mpf082205.pdf

length of the planktonic period, oceanography and current regimes, larval behavior, and environmental conditions (e.g., temperature and sources of entrainment). Like adult movement patterns, the dispersal of juveniles, larvae and eggs varies enormously among species. Some barely move from their natal site. Others disperse vast distances. Marine zones will only be connected through the dispersal of young if they are close enough together to allow movement from one zone to another. Any given spacing of marine zones will undoubtedly provide connectivity for some species and not for others. The challenge is minimizing the number of key or threatened species that are left isolated by widely spaced marine zones.

Based on emerging genetic data from species around the world, larval movement of 50-100 km (27-54 nmi^2) appears common in marine invertebrates (Kinlan and Gaines 2003, Palumbi 2004). For fishes, larval neighborhoods based on genetic data appear generally larger, ranging up to 100-200 km (54-108 nmi^2). For marine birds and mammals, dispersal of juveniles of hundreds of km is not unusual, but for some of these species, return of juveniles to natal areas can maintain fine-scale population structure. For marine zones to be within dispersal range for most commercial or recreational groundfish or invertebrate species, they will need to be spaced on the order of no more that 50-100 km (27-54 nmi) apart. Otherwise, a large fraction of coastal species will gain no benefits from connections between marine zones. Although dispersal data appear to be valid for a wide range of species, there are only a small number of coastal marine species in California that allow these estimates of larval neighborhoods to be made with confidence. Nonetheless, it is the distribution of dispersal distances across species that really drives network design rather than the specific patterns for any particular species.

If the distance between suitable habitat patches in adjacent marine zones exceeds the average dispersal of young invertebrates and fishes, then the marine zones do not function as an ecological network. Distances between protected habitats of the same type in adjacent marine zones were estimated for Alternatives 1 and 2. For example, it is possible to estimate the distance, for Alternative 2, between unclassified sediments (100-200 m depth) in Harris Point MR and Carrington Point MR, but the same estimate is not possible for Alternative 1 because no substrate is protected at 100-200 m depth around Carrington Point in Alternative 1. The nearest protected area (100-200 m depth) along the north side of the Channel Islands is Scorpion MR. The patterns of spacing for each alternative suggest the potential connectivity and/or independence of marine zones. The existing State marine zones in the nearshore also protect suitable habitats that are, in many cases, contiguous with proposed offshore marine zones. The distances between protected habitats of the same type were estimated from marine zones proposed in alternatives 1 and 2 to existing State marine zones or proposed marine zones, whichever was closer.

The average distance between protected habitats of the same type in adjacent marine zones in Alternative 1 is 22.7 nmi, well within the guidelines recommended by the Science Advisory Team. There are 32 possible connections between protected habitats in Alternative 1. Although Alternative 1 does not include any suitable protected deepwater habitat at Carrington Point, the

distance between Harris Point MR and Scorpion MR is approximately 36 nmi, within the range recommended for zonal spacing. Therefore, the proposed marine zones on the north side of the Channel Islands may serve as an interconnected network. Because of its remote location, Santa Barbara Island MR is likely to have the least ecological connection to other marine zones around the northern Channel Islands. The distance between two habitats, soft sediments on the deep continental shelf (100-200 m) and slope (>200 m), protected within South Point MR and Santa Barbara Island MR are likely to be too far for effective ecological exchange. However, there is potential for exchange of larvae between Santa Barbara Island MR and three of the other marine zones proposed in Alternative 1, including Gull Island MR, the Footprint MR, and Anacapa Island MR. Of some concern is the limited number of connections (1 or 2) in Alternative 1 between protected patches of rocky substrate at all depth intervals.

The average distance between protected habitats of the same type in adjacent marine zones in Alternative 2 is 18.4 nmi, well within the guidelines recommended by the Science Advisory Team. There are 42 possible connections between protected habitats in Alternative 2 (Figure 10). In contrast to Alternative 1, this alternative includes deepwater habitat at Carrington Point, reducing the distance between protected deepwater habitats on the north side of the Channel Islands. Smaller distances between protected habitats lead to greater potential ecological connectivity among marine zones. Additional habitat protected in the Judith Rock MR and South Point MR increases potential connectivity along the south side of the northern Channel Islands. Because of its remote location, Santa Barbara Island MR is not likely to have strong ecological connections to other marine zones around the northern Channel Islands. The distance between two habitats, soft sediments on the deep continental shelf (100-200 m) and slope (>200 m), protected within South Point MR and Santa Barbara Island MR is likely to be too far for effective ecological exchange. However, there is potential for exchange of larvae between Santa Barbara Island MR and three of the other marine zones proposed in Alternative 1, including Gull Island MR, the Footprint MR, and Anacapa Island MR. Of concern is the limited number of connections (1 or 2) between protected patches of rocky substrate at all depth intervals in Alternative 2.

4.0 AFFECTED ENVIRONMENT

This section briefly describes the affected environment within the CINMS project area. A detailed characterization of the ecology of the Sanctuary and associated human uses can be found in four documents:

- California Department of Fish and Game (CDFG 2002). Final 2002 Environmental Document. Marine Protected Areas in the National Oceanic and Atmospheric Administration's Channel Islands National Marine Sanctuary. Volume I and II. October. http://www.dfg.ca.gov/mrd/ci_ceqa/index.html
- NOAA National Centers for Coastal Ocean Science (NCCOS 2006). A Biogeographic Assessment of the Channel Islands National Marine Sanctuary & Surrounding Areas: A Review of Boundary Expansion Alternatives for NOAA's National Marine Sanctuary Program. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD. http://ccma.nos.noaa.gov/ecosystems/sanctuaries/chanisl_nms.html
- U.S. Department of Commerce. National Oceanic and Atmospheric Administration (NOAA 2006). National Marine Sanctuary Program. Section 3.0, "Affected Environment," Volume 2, /Channel Islands// National Marine Sanctuary Draft Management Plan / Draft Environmental Impact Statement/. Silver Spring, MD. http://www.cinms.nos.noaa.gov/manplan/overview.html
- Leeworthy, Vernon R., and Peter C. Wiley (Leeworth and Wiley 2005). *Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary.* National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, Maryland. October 7. http://www.cinms.nos.noaa.gov/marineres/mrec.html

The material and information in these documents are incorporated by reference where possible. More recent data is also included where applicable to update the information contained in the above-referenced documents. These documents show that the CINMS is a key component of the greater ecology of southern California (NPS 2003; McGinnis 2000, 2005; NCCOS 2006).

4.1 Overview

Long- and short-term environmental fluctuations have major effects on the abundances of birds, plankton, kelp and other marine organisms described above. The influence of environmental fluctuations on marine ecosystems of the area is described in CDFG (2002) and NOAA (2006). Some well-known environmental fluctuations are those precipitated by El Niño events, which change the patterns of Pacific Ocean currents and affect global weather every few years (Larkin and Harrison 2001). El Niños lead to the intrusion of warm water into high latitudes and major changes in the distribution and abundance of many species (Hayward 2000).

As described in Section 2.0, there has been a general decline in the abundance of many species and habitats since the designation of the CINMS. Some of the causes of decline include overfishing, pollution, climate variability, habitat destruction, and the introduction of non-native invasive species (Jackson *et al.* 2001). Marine scientists describe ecosystem change in the SCB at every level of the food web (CDFG 2002; NOAA 2006). Jackson *et al.* (2001) describe the loss of major predators and the decline of general diversity in kelp ecosystems of the marine area. The decline in seabirds noted above is a particular concern, since the presence of birds are important indicators of the health of an ecosystem (Sekercioglu, Daily and Ehrlich 2004).

The decline in primary and secondary levels of ecological productivity of the SCB began before the designation of the Sanctuary in 1980 (McGowan *et al.* 1998). The 1977 regime shift reduced upwelling of nutrient rich water. As noted above, there has been a decline in kelp biomass, macrozooplankton, many species of birds and invertebrates, and marine bird biomass (Bograd *et al.* 2000; Schwing *et al.* 2002). One consequence has been that the maintenance of community structure and patterns of species diversity have changed since the designation of the Sanctuary (Hayward *et al.* 1996; McGowan *et al.* 1998; Benson and Trites 2002).

4.2 Ecological Environment

4.2.1 Physical Environment

The physical oceanography of the SCB is a dynamic process resulting from the interaction of large-scale ocean currents, climate, local geography, and the unique basin and ridge topography of the ocean bottom in the SCB. A comprehensive characterization of the physical processes of the SCB is depicted in Harms and Winant (1998). Much of the uniqueness and marine ecosystem diversity of the SCB is due to the mixing of water masses from the south-flowing cold California Current and the north-flowing warm Southern California Countercurrent around the northern Channel Islands (NCCOS 2006).

4.2.2 Biological Environment

4.2.2.1 Biogeographical Provinces

The marine area associated with the CINMS includes three biogeographic regions: (1) the colder Oregonian Province, (2) the warmer California Province, and (3) the transition zone between the two. Point Conception is often identified as marking the transition between the Oregonian and Californian Provinces (Horn and Allen 1978; Murray and Littler 1981; Murray and Bray 1993; NCCOS 2006). Changes in the ecology of the provinces are influenced by hydrographic conditions of the SCB and ocean-climate variability (Murray and Bray 1993; McGowan *et al.* 1998; NCCOS 2006). San Miguel Island typically lies in the colder waters of the Oregonian Province while Anacapa and Santa Barbara Islands are typically in the warmer Californian Province. The eastern side of Santa Rosa Island and Santa Cruz Island are generally in the transition zone (Horn and Allen 1978; NCCOS 2006).

4.2.3 Habitats and Associated Marine Life

The CINMS contains many important and varied physical and geological features including a complex of plateaus, continental slope, gyres, banks, submarine canyons and rocky reefs. A more detailed discussion of the habitat types and associated species is found in Leet *et al.* (2001), CDFG (2002) and the CINMS Draft Management Plan/DEIS (NOAA 2006). The primary habitats found within the CINMS include kelp forests, surfgrass and eelgrass beds, rocky and sandy intertidal, rocky and sandy nearshore subtidal, deep-water benthic, and pelagic habitats. A brief description of major habitats of the CINMS follows.

4.2.3.1 The Photic Zone

This portion of the water column is the upper sunlight zone of the sea, usually down to 30 m depth. It is an important part of the marine ecosystem because it is where photosynthesis takes place and is a nursery area for many species of marine life. Smith and Kaufmann (1994) show a long-term deficit in the supply of food necessary to meet the metabolic demands of the sediment community. The long-term increase in sea surface and upper water column temperatures and physical stratification in the system has resulted in a lower rate of supply of nutrients to the euphotic zone. This has lead to a decrease in productivity and a general decline of zooplankton and other species (e.g., larval fish production, seabirds, kelp production and a shift in benthic, intertidal community structure).

4.2.3.2 Kelp Forests

Kelp forests in the Sanctuary are highly productive habitats that provide food, attachment sites, and shelter for myriad of invertebrates and fishes. Locations supporting kelp generally have been consistent through time, but the extent of these beds has varied considerably based on environmental conditions such as sea water temperature and presence or absence of natural predation. Starting in the late 1970s, Tegner *et al.* (1996, 1997), Tegner and Dayton (1991), and Dayton *et al.* (1992) show that kelp forests have suffered great damage. Tegner *et al.* (1997) show a two-thirds reduction in standing biomass since 1957 in southern California kelp forests. This trend in the decline in kelp ecosystems began before the low-nutrient regime of 1977 (McGowan *et al.* 1998).

4.2.3.3 Surfgrass and Eelgrass

Surfgrass and eelgrass beds are also highly productive and complex microhabitats that support a wide variety of marine species. These marine areas are important nursery areas. The largest beds of eelgrass in the Sanctuary occur at Smugglers Cove, Canada del Agua, and Prisoners Harbor on Santa Cruz Island and at Bechers Bay on Santa Rosa Island.

4.2.3.4 Intertidal

The intertidal zone comprises a variety of coastal habitats that are periodically covered and uncovered by waves and tides. Intertidal habitat within the CINMS is composed of approximately 94.5 miles of rocky coastline interspersed with approximately 47 miles of sandy beaches (CDFG 2002). A wide variety of sedentary invertebrates, including barnacles, limpets, and mussels compete for space with plants in the intertidal zone. This zone also provides important habitat for fish, seabirds, seal and sea lions.

4.2.3.5 Nearshore Subtidal

Nearshore subtidal habitats include mud, sand, gravel, cobble, and bedrock substrates. Nearshore subtidal rocky habitats at the Islands are widespread, especially high relief volcanic reefs with walls, ledges, caves, and pinnacles occur between 0-30 m depth. Typical shallow subtidal areas in the Sanctuary contain assemblages of plants, invertebrates, and fishes, with giant kelp dominating. However, many shallow reefs grazed by sea urchins have less giant kelp and greatly reduced species diversity. Many sandy nearshore habitats in the Sanctuary have relatively steep slopes composed of coarse shelly debris. Stable sand habitats with fine grain sediments are generally limited to sheltered coves at canyon mouths, such as those found around Santa Cruz Island.

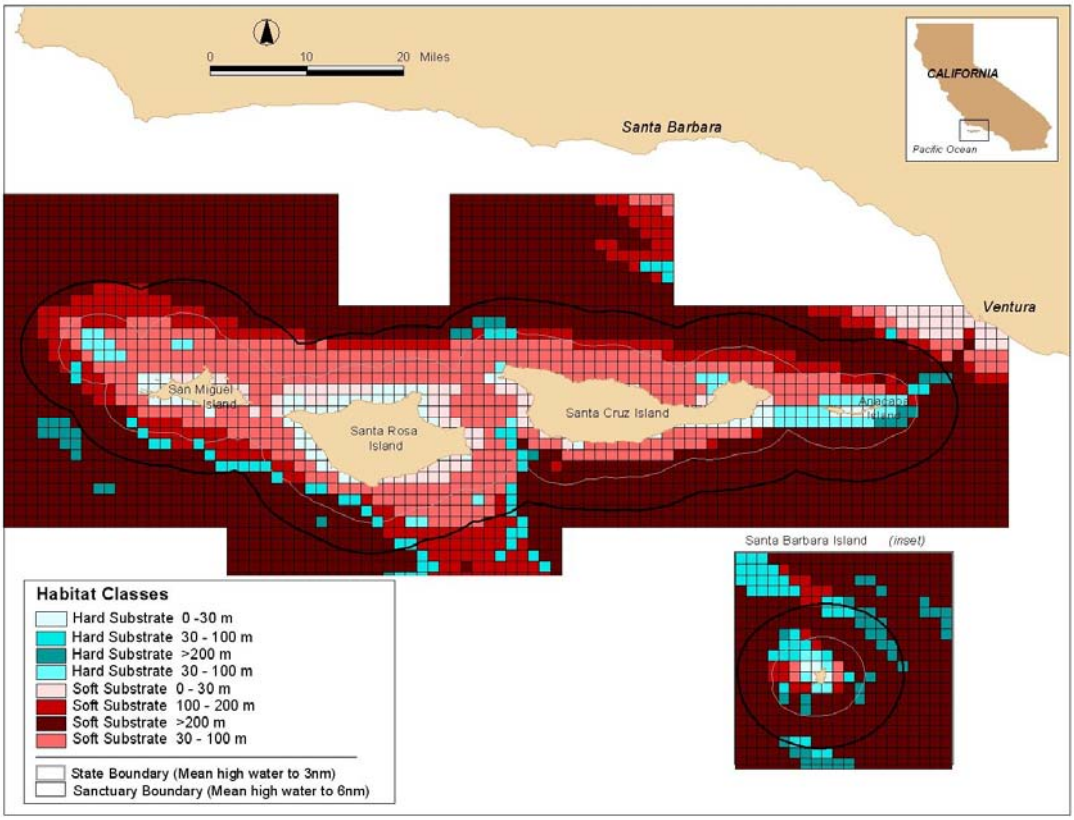
4.2.3.6 Deep-Water Benthic

Beyond nearshore subtidal depths are deep-water habitats extending from 100-200 m depth. Well over 90 percent of deep-water benthic habitats in the Sanctuary consist of fine sands in shallower portions, grading into silt and clay-dominated sediments in deeper portions (Science Applications International Corporation 1986; Thompson *et al.* 1993). In addition, deep rock bottoms are often located offshore from major headlands and Islands, and on the highest parts of undersea ridges, banks, and pinnacles. High relief pinnacles and ridges occur in some areas, such as off the northwest end of San Miguel Island.

4.2.3.7 Pelagic Habitats

Water column, or pelagic, habitats consist of discrete portions of ocean waters categorized by variation among multiple factors, such as light penetration, temperature, oxygen concentration, and density. Water column habitats within the majority of the Sanctuary do not extend deeper than the mesopelagic zone (from approximately 200 – 1000 m depth), though the southern reaches of the CINMS boundary near the mouth of Santa Cruz Canyon (a submarine canyon between and offshore from southeastern Santa Rosa Island and southwestern Santa Cruz Island) approach bathypelagic depths (from approximately 1000 m to 3500 m). Figure 11 depicts the habitat types of the CINMS.

Figure 11 Habitat Types of the CINMS



Appendix G: Species of Interest shows the associations of the species with these habitats, and their management status (i.e., if in decline).

4.2.4 Plant And Animal Species

The CINMS supports a great diversity of marine species, many of which are extremely rare and afforded special protection by Federal and State law. A comprehensive characterization of marine life of the project area is described in Leet *et al.* (2001) and CDFG (2002). A brief summary of major plant and animal species follows:

4.2.4.1 Plankton

Plankton, single celled pelagic marine plants (phytoplankton) and animals (zooplankton) form the base of the food web. Many species of plankton inhabit the CINMS and marine life is highly dependent on their growth and productivity. Their numbers, biomass, and production vary greatly both spatially and temporally.

Since the late 1970s, macrozooplankton volume in the California Current has declined over 70 percent, in concert with increasing sea surface temperatures (Roemmich and McGowan 1995a,b; McGowan *et al.* 1998). Reduced macrozooplankton has a major impact at higher trophic levels by changing the nature of the food supply. Long-term decreases in zooplankton in the SCB and California Current System have drawn considerable attention, since zooplankton are fundamental to the health of the entire ecosystem (Sagarin *et al.*1999).

4.2.4.2 Marine Plants

Marine plants of the CINMS are made up of algae and seagrasses. Diversity of marine plants is greater in the SCB and the Channel Islands than along coastal central California. In the SCB, there are at least 492 species of algae and 4 species of seagrasses known to occur of the 673 species described for California (Abbott and Hollenberg 1976; Murray and Bray 1993). Giant kelp, surfgrass and eelgrass are marine plants that provide important habitat and nursery areas for marine life.

4.2.4.3 Fishes and Invertebrates

The CINMS supports a wide variety of invertebrates due to its transitional location between cold and warm biogeographic provinces and diversity of substrates. The total number of species may well be in excess of 5,000, not including microinvertebrates (Smith and Carlton 1975; Straughan and Klink 1980). Marine invertebrates may be benthic (bottom-dwellers) or pelagic, and may range in size from little known microscopic forms (micro-invertebrates) to the more common larger organisms (macro-invertebrates). Select invertebrates in the CINMS include multiple species of corals, prawns, spiny lobster, crabs, sea urchins, sea cucumbers, sea star, abalone, nudibranchs, scallops, mussels, squid, clams, barnacles, snails, salps, tunicates, jellyfish, sea slugs, and anemones. White abalone is protected by the ESA.

About 481 species of fish inhabit the SCB (Cross and Allen 1993). Select fishes commonly found in the CINMS include: albacore, anchovy (northern), bass (various species), cabezon, California sheephead, California halibut, garibaldi, rockfish (various species), salmon (king), sardine (Pacific), shark (various species), surfperch (various species), swordfish, and white sea bass.

CDFG data show decreases in landings for several categories of groundfish, California sea urchin, swordfish and selected shark species, Pacific mackerel, Pacific herring, California halibut, market squid (for the period 1997-1998) among others (CDFG 2002). Dugan and Davis (1993) document the general decline in long-term productivity in 19 species of nearshore fishes and invertebrates in California from 1947 to 1986. A study by Love *et al.* (1998) of long-term trends in the SCB commercial rockfish fishery shows a substantial decline from 1980 to 1996, with extremely low catches from 1993 to 1996.

4.2.4.4 Sea Turtles

Four species of sea turtles have been reported in the offshore southern California region: green, loggerhead, olive Ridley, and leatherback (Cordaro 2003). Most information on sea turtle distribution in southern California is based on stranding data. This stranding data indicates that for the Channel Islands area all four species of sea turtle may be found within the CINMS at any time of year (Cordaro 2003). All sea turtles are protected by the ESA.

4.2.4.5 Seabirds

Over 195 species of birds use open water, shore, or island habitats in the SCB (Baird 1990). The Channel Islands region is located along the Pacific Flyway, a major migratory route for birds, and acts as a stopover during both north (April through May) and south (September through December) migrations. The months of June and July are peak months for transient shorebirds (Lehman 1994). The diversity of habitats provided both on- and offshore also contributes to the high species diversity in the region. Sandy beaches provide foraging and resting habitat for a number of shorebirds including Black-Bellied Plover, Willet, Whimbrel, Long-billed Curlew, gulls, and sanderlings. The upland potions of the beach provide kelp deposits that attract invertebrates where Black and Ruddy Turnstones, dowitchers, and other shorebird species forage. Several bird species within the CINMS region have special status (of concern, threatened or endangered) under Federal or State law. The CINMS provides important habitat for eight seabirds that have special status under Federal or State law: Ashy storm-petrel, Black storm-petrel, California brown pelican, California least tern, Double-crested cormorant, Rhinoceros auklet, Western snowy plover, Xantus' murrelet.

Evidence suggests that the abundance of many species of oceanic birds has declined steadily since 1988 (Veit *et al.* 1996, 1997). Veit *et al.* (1996) show that the decline in bird biomass reflects considerable biological change within the California Current System. Veit *et al.* (1996, 1997) indicate that ocean warming and climatic events change pelagic bird abundance within the California current system. Surveys of overall bird abundance remained below the levels recorded off southern California during the late 1970s (Tyler *et al.* 1993) and the late 1980s (Viet *et al.* 1996). There has been no observation of a recovery of the sooty shearwater, a trans-equatorial migrant that dominated avifauna in the late 1980s. Overall, cold-water species have declined by 71% between the beginning (1987-1990) and the end (1995-1998) of the California Cooperative Fisheries Investigation (CalCOFI) surveys (Hyrenbach and Viet 1999).

4.2.4.6 Marine Mammals

There are three marine mammal groups in the CINMS: 1) whales, dolphins and porpoises (cetaceans); 2) seals and sea lions (pinnipeds); and 3) the southern sea otter. All marine mammals are protected under the Marine Mammal Protection Act of 1972 (MMPA). Additionally, some marine mammals are protected under the Federal and State ESA. At least 33 species of cetaceans have been reported in the CINMS region (Leatherwood *et al.* 1982;

Leatherwood *et al.* 1987). Common species found in the CINMS include: long-beaked common dolphin, short-beaked common dolphin, Bottlenose dolphin, Pacific white-sided dolphin, Northern right whale dolphin, Risso's dolphin, California gray whale, Blue whale, and Humpback whale.

Historically, seven species of pinnipeds have been found throughout or in part of the CINMS: the California sea lion (common), northern fur seal (uncommon), northern elephant seal (common), Pacific harbor seal (common), Guadalupe fur seal (rare), Steller sea lions (extremely rare), and ribbon seal (extremely rare). The productive waters and relatively undisturbed environment of the CINMS provides vital habitat for these pinniped species, offering important feeding areas, breeding sites, and haul outs. Finally, sea otters were common in the Channel Islands until prolonged periods of hunting led to local extinction at the Islands and severe depletion along the mainland California coast. From 1987 to 1990, the USFWS, which has primary jurisdiction over sea otters, translocated 139 otters to San Nicolas Island, though as of 2003 only 33 animals were reported (Sanders 2003). Following the translocation, rare sightings of sea otters in the CINMS have been reported.

4.3 Socio-economic Environment

The CINMS attracts many commercial and recreational users. The northern CINMS is accessible from Santa Barbara, Ventura, Port Hueneme, and Channel Islands Harbors as well as ports in Los Angeles County (primarily San Pedro and Terminal Island). Human use of the CINMS is not limited to regional residents; almost 20 percent of those who use California's coastal areas for recreation are interState or international visitors (California Resources Agency 1997).

In coastal southern California, population growth has risen sharply over the last twenty years. The population of southern California is nearly 20 million, including a combined population of over 1.1 million for Santa Barbara and Ventura (U.S. Census Bureau 2000). This represents a regional increase in population of approximately 43% since 1980 (U.S. Census Bureau 1995). As the numbers of people increase, so do the number of CINMS users involved in a wide variety of activities.

This section briefly describes socioeconomic information on the human activities within the CINMS.

4.3.1 A Socioeconomic Overview

A detailed characterization of the socioeconomic uses of the marine area is found in Leeworthy and Wiley (2005) and the CINMS Draft Management Plan/DEIS (NOAA 2006). Figure 12 shows a map of the seven-county area defined as the socioeconomic impact area. All seven counties are impacted by commercial fishing activities in the CINMS and five counties (i.e., Santa Barbara, Ventura, Los Angeles, Orange and San Diego) are impacted by recreational

activities in the CINMS. In Leeworthy and Wiley (2003), impacts of recreational activities were limited to the three-county area of Santa Barbara, Ventura and Los Angeles counties. However, in updating recreational fishing activity data from CDFG logbooks, it was found that some activity in the CINMS originates out of Orange and San Diego counties.

The seven-county impact area had a 2000 population of over 16.98 million. Between 1990 and 2000, the population of the project area grew at a slower pace than the entire State of California or the U.S (Table 9). The seven-county area had a much higher population density and higher poverty rate than either the State of California or the U.S. The higher population densities are mostly influenced by the inclusion of Los Angles and Orange counties, which have extremely high population densities, while the relatively high poverty rate is due to Los Angeles County. For per capita income, the seven-county area is higher than the U.S. but lower than the State of California.

Figure 12 Counties of Impact

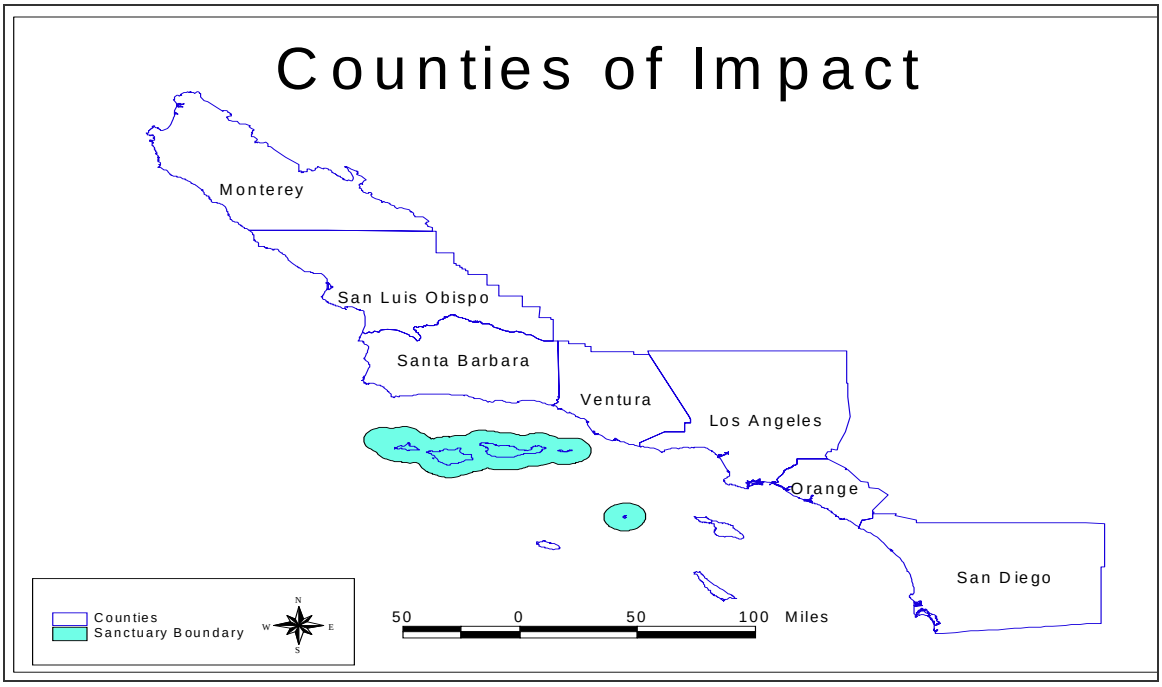


Table 9 Selected Socioeconomic Measures for Description of Impact Areas

County	2000 Population	Population Change 1990-2000	Population Density[1]	1999 Per Capita Income	1997 Persons Below Poverty
Monterey	401,762	13.0%	120.9	$29,393	15.4%
San Luis Obispo	246,681	13.6%	74.7	$25,888	12.9%
Santa Barbara	399,347	8.0%	145.9	$30,218	14.6%
Ventura	753,197	12.6%	408.2	$29,639	10.3%
Los Angeles	9,519,338	7.4%	2344.1	$28,276	20.5%
Orange	2,846,289	18.1%	3607.5	$33,805	11.0%
San Diego	2,813,833	12.6%	670.0	$29,489	14.2%
All Counties	16,980,447	10.4%	838.2	$28,932	17.0%
California	33,871,648	13.6%	217.2	$29,856	16.0%
U.S.	281,421,906	13.1%	79.6	$28,546	13.3%

Note: 1. Number of people per square mile

Source: U.S. Department of Commerce, Bureau of the Census, State and County Quickfacts (http://quickfacts.census.gov)

The baseline relationship between the local economies (county economies) and the use of the CINMS is depicted in Table 10, which shows personal income and employment by county for the seven-county impact area. Personal income is presented from two perspectives, by place of work and by place of residence. This is an important distinction because many county economies are less dependent on sources of income from work- related activities in the county, i.e., they derived their incomes from sources outside the county. Sources of incomes from outside the county include retirement pensions, dividends and interest from investments and from work in other counties (commuters). All seven counties in the impact areas have larger personal incomes by place of residence than by place of work.

Table 10 Personal Income and Employment by County 2002

County	Personal Income By Work 000's $	Personal Income By Residence 000's $	Employment Number Full and Part time Jobs
Monterey	$9,355,753	$13,091,490	235,299
San Luis Obispo	$4,765,471	$7,598,506	147,468
Santa Barbara	$9,510,574	$13,701,154	254,600
Ventura	$17,215,448	$27,006,291	420,712
Los Angeles	$254,950,305	$300,898,080	5,554,695
Orange	$88,310,525	$112,266,897	1,901,499
San Diego	$79,407,259	$101,292,563	1,806,321
Region Total	**$463,515,335**	**$575,854,981**	**10,320,594**

Economic impacts were estimated for each activity in the CINMS at the baseline level of activity, for each of the 7 counties in the impact area. For the baseline, all activities in the CINMS generated just over $100 million in personal income (Table 11). The estimate of employment (number of full and part-time jobs) is about 3,300 (Table 12). However, the estimates are underestimates due to a lack of information on the amount of non-consumptive recreation from private household boats. Including private household non-consumptive recreation would probably result in estimates of between $110 and $120 million in income and between 4 and 4.5 thousand jobs that depend on the uses of the CINMS.

Table 11 and Table 12 show the estimates for personal income and employment generated from each activity in each county. These estimates are for the baseline, i.e., the amount of activity estimated can be sustained in the future. The local economy for percentage comparisons is the latest year available (2002). Directly under each estimate is the percent of the total personal income or employment that a given activity accounts for in each county's economy. Across all activities, the estimate of personal income impact of about $101.8 million was less than two one-hundredths of one percent (a small fraction of one percent) of the entire seven-county area. If all the activities in the CINMS were prohibited, it would not have significant impact on the total economy of the seven-county region. Here the use of "significant impact" addresses to the relationship between the activities to the entire economy of the region. If all the consumptive activities in the CINMS were prohibited, the economic impact would fall just short of the $100 million mark, above which a benefit-cost analysis is required by Presidential Executive Order 12866.

Table 11 Local/Regional Economic Dependence on CINMS: Baseline Personal Income

County	Commercial Fishing	Consumptive Recreation	Total Consumptive	Nonconsumptive Recreation[1]	All Activities
Monterey	$6,728,959	$0	$6,728,959	$0	$6,728,959
%[2]	0.0514	0.0000	0.0514	0.0000	0.0514
San Luis Obispo	$76,970	$18,111	$95,081	$0	$95,081
%	0.0010	0.0002	0.0013	0.0000	0.0013
Santa Barbara	$9,198,223	$2,661,635	$11,859,858	$1,175,291	$13,035,149
%	0.0671	0.0194	0.0866	0.0086	0.0951
Ventura	$35,829,050	$22,071,373	$57,900,423	$2,488,506	$60,388,929
%	0.1327	0.0817	0.2144	0.0092	0.2236
Los Angeles	$10,328,981	$1,522,518	$11,851,499	$68,424	$11,919,923
%	0.0034	0.0005	0.0039	0.0000	0.0040
Orange	$13,005	$88,591	$101,596	$0	$101,596
%	0.0000	0.0001	0.0001	0.0000	0.0001
San Diego	$9,474,771	$54,329	$9,529,100	$0	$9,529,100
%	0.0094	0.00005	0.0094	0.0000	0.0094
All Counties	$71,649,948	$26,416,557	$98,066,505	$3,732,222	$101,798,727
%	0.0124	0.0046	0.0170	0.0006	0.0177

1. Nonconsumptive recreation and All Activities are under estimated because no information was available for nonconsumptive recreation using private household boats to access the CINMS.
2. Percents are the percent of the total economy of each county, or for all counties, the percent of the regional totals for all seven counties. For the total economy, year 2002 was used (latest year available).

Table 11 and Table 12 show that none of the seven counties in the seven-county impact area is significantly impacted by the activities in the CINMS. The highest impact is in Ventura County, which depends on activities in the CINMS for about one quarter of one percent of its income and about one half of one percent of the county's employment.

Table 12 Local/Regional Economic Dependence on CINMS - Baseline Employment

County	Commercial Fishing	Consumptive Recreation	Total Consumptive	Nonconsumptive Recreation[1]	All Activities
Monterey	199	0	199	0	199
%[2]	0.0846	0.0000	0.0846	0.0000	0.0846
San Luis Obispo	3	0.9	3.9	0	3.9
%	0.0020	0.0006	0.0026	0.0000	0.0026
Santa Barbara	299	118.9	417.9	62	479.7834081
%	0.1174	0.0467	0.1641	0.0243	0.1884
Ventura	1,090	944	2,034	135	2,168
%	0.2591	0.2243	0.4833	0.0320	0.5153
Los Angeles	273	67.6	340.6	4	344.1874439
%	0.0049	0.0012	0.0061	0.0001	0.0062
Orange	0	4.5	4.5	0	4.5
%	0.0000	0.0002	0.0002	0.0000	0.0002
San Diego	92	2.8	94.8	0	94.8
%	0.0051	0.0002	0.0052	0.0000	0.0052
All Counties	**1,956**	**1,138**	**3,094**	**200**	**3,294**
%	**0.0190**	**0.0110**	**0.0300**	**0.0019**	**0.0319**

1. Nonconsumptive recreation and All Activities are under estimated because no information was available for nonconsumptive recreation using private household boats to access the CINMS.
2. Percents are the percent of the total economy of each county, or for all counties, the percent of the regional totals for all seven counties. For the total economy, year 2002 was used (latest year available).

4.3.2 Recreational Activities

Recreational and tourist-related activities occur throughout the CINMS. Many activities are more heavily concentrated close to the Islands and on the eastern half of the CINMS. Sportfishing, diving, whale watching, pleasure boating, kayaking, surfing, and sightseeing are all popular pastimes within the CINMS.[14] Table 13 depicts the baseline person-days of recreation in the CINMS for both consumptive and non-consumptive activities.

Table 13 Baseline Person Days of Recreation Activity in the CINMS

	Person-days (number)	Person-days (percent)
Consumptive Activities		
Charter/Party Boat Fishing	150,872	33.7%
Charter/Party Boat Consumptive Diving	35,977	8.0%
Private Boat Fishing	214,015	47.8%
Private Boat Consumptive Diving	47,190	10.5%
Total Consumptive	448,054	100.0%
Non-consumptive Activities		
Whale Watching	25,984	61.9%
Non-consumptive Diving	10,776	25.7%
Sailing	4,015	9.6%
Kayaking/Island Sightseeing	1,233	2.9%
Total Non-consumptive	42,008	100.0%

In the baseline, the recreation industry included a total of 490,062 person-days of consumptive and non-consumptive recreation. Consumptive recreation was 91.4 percent of all recreation activity in the CINMS. The "for hire" industry accounted for almost 46.7 percent of all the person-days of recreation activity, which is important because the estimates of use from this industry were based on a census, not a sample, of all operators who operate in the CINMS.

14 The National Park Service bans use of motorized personal watercraft within one nmi of the Islands.

Table 14 and Table 15 provide additional detail on consumptive and non-consumptive recreational activities.

Table 14 Baseline Level of Consumptive Recreation Activity - Study Area Total

	Charter Boat Fishing	Charter Boat Diving	Private Boat Fishing	Private Boat Diving
Person days				
	150,872	35,977	214,015	47,190
Market Impact				
Direct Sales	$19,632,128	$5,786,598	$20,177,334	$3,020,161
Direct Wages and Salaries	$7,443,728	$2,113,480	$8,001,923	$1,130,245
Direct Employment	457	131	334	50
Total Income	$10,630,288	$3,057,483	$11,155,937	$1,572,849
Total Employment	525	151	403	59
Non-market impact				
Consumer's Surplus	$5,242,348	$1,250,111	$7,724,656	$1,703,276
Profit[1]	$447,585	$76,584	n/a	n/a

[1]Profit is used as a proxy for producer's surplus.

Table 15 Baseline Level of Non-Consumptive Recreation Activity - Study Area Total

	Whale Watching	Non-Consumptive Diving	Sailing	Kayaking/ Sightseeing
Person days				
	25,984	10,776	4,015	1,233
Market Impact				
Direct Sales	$4,288,380	$1,840,581	$711,267	$257,487
Direct Wages and Salaries	$1,561,168	$669,425	$258,440	$93,189
Direct Employment	104	45	18	7
Total Income	$2,255,682	$967,704	$373,781	$135,056
Total Employment	119	52	20	8
Non-market impact				
Consumer's Surplus	$902,867	$374,425	$139,496	$42,844
Profit[1]	$275,878	$195,922	$137,119	$2,672

[1]Profit is used as a proxy for producer's surplus.

During the MRWG process, literature and studies related to fishing in Southern California were reviewed, with one study for all of California party boat fishing (NMFS, 1980; Wegge, Hanemann and Strand, 1983; Rowe, Morey, and Ross, 1985; Hanemann, Wegge and Strand, 1991; Thompson and Crooke, 1991). Consumptive diving and non-consumptive activity information was supplemented with a visitor's study for Santa Barbara County (Santa Barbara County Conference & Visitors Bureau and Film Commission, 1999) for lodging, food, and beverage expenditure and a study on diving in Northwest Florida for some dive related costs (Bell, Bonn and Leeworthy, 1998). Also, from the charter/party operations, the boat fee per person-day by county was derived. From all this information, expenditure profiles were constructed for these activities. Because the focus was on mostly regional studies, the expenditure profiles do not differ by county except for the charter/party boat fees category. The expenditure profiles used for charter/party boat and private boat fishing were taken from Gentner, Price and Steinback (2001).

Table 16 shows the expenditure profiles developed for each activity/boat mode. Low food, beverage and lodging costs indicate a low percentage of users being overnight visitors or dominated by local users. In 1999, coastal residents accounted for 86.7% of charter/party boat trips and 96.86% of private household boat trips for fishing in Southern California (NMFS, MRFSS 1999). Not all the profiles had consistent categories, sometimes food and beverage were reported separately and sometimes they were aggregated together. When reported separately, the separated categories in the impact analysis were used.

Table 16 Expenditure Profiles for Recreation Activities in the CINMS (1999 $)

	Expenditures Per Person-day (1999 $)			
	Fishing - Charter/Party Boat	**Fishing - Private Boat**	**Diving - Charter/Party Boat**	**Diving - Private Boat**
Expenditure				
Boat Fees[1]	$47.62 - 60.74	n/a	$40.21 - 92.56	n/a
Boat Fuel	n/a	$12.74	n/a	$19.00
Food, Bev, Lodging	n/a	n/a	$82.00	$11.00
Food	$15.47	$7.60	n/a	n/a
Lodging	$8.65	$1.20	n/a	n/a
Transportation	n/a	n/a	$10.00	$9.00
Private Transportation	$16.64	$8.90	n/a	n/a
Public Transportation	$33.07	$1.89	n/a	n/a
Equipment/Equip. Rental	$6.01	$0.91	n/a	$5.00
Miscellaneous	n/a	n/a	$15.00	$10.50
Access/Boat Launch Fees	$1.18	$1.52	n/a	n/a
Air Refills	n/a	n/a	n/a	$7.00
Bait/Ice	$0.52	$6.77	n/a	$2.50
Total[2]	$129.16-$142.28	$41.53	$132.21-$184.56	$64.00

	Whale Watching - Charter/Party Boat	**Non-consumptive Diving**	**Sailing - Charter/Party Boat**	**Kayaking/Island Sightseeing**
Expenditure				
Lodging	$53.00	$53.00	$53.00	$53.00
Eating & Drinking	$29.00	$29.00	$29.00	$29.00
Transportation	$10.00	$10.00	$10.00	$10.00
Charter Boat Fee[1]	$53.43-60.19	$40.56-81.78	$61.99-177.61	$50.77-104.67
Miscellaneous	$15.00	$15.00	$15.00	$15.00
Total[2]	$160.43-167.19	$147.56-188.78	$168.99-284.61	$157.77-211.67

1. Boat fees used were actual by county and activity from the Kolstad survey. They are:

	SB	Ventura	LA
Charter/Party Boat Fishing	$60.74	$47.62	$59.95
Charter/Party Boat Diving	$40.21	$64.50	$92.56
Whale Watching	$53.43	$60.19	$n/a
Non-Consumptive Diving	$40.56	$81.78	$48.48
Sailing	n/a	$61.99	$177.61
Kayaking/Island Sightseeing	$104.67	$50.77	n/a

2. The total varies because we used the actual charter/party boat fee by activity

In 1999, sportfishing and consumptive diving activity in the CINMS generated approximately $24 million in income and supported 654 full and part-time jobs in Santa Barbara, Ventura and Los Angeles counties (Leeworthy and Wiley 2003). Recreational fishing is typically done with hook-and-line, nets and spearguns and may be conducted from shore, from vessels, or using SCUBA equipment (consumptive diving). Both recreational and consumptive diving (including SCUBA and free-diving) in the CINMS take place primarily from private and chartered commercial passenger fishing vessels (CPFVs).

Recreational fishers have access to nearshore and offshore areas, targeting bottom and mid-water fish species, primarily in the eastern half of the CINMS. Types of fish landed on CPFVs include kelp bass, mackerel, California sheephead, halfmoon, and whitefish. Species commonly targeted by consumptive divers, who travel from all over the world to dive in the CINMS, include many rockfish species and kelp bass, halibut, yellowtail and white seabass, as well as lobster and scallops. Offshore fishing often focuses on such species as yellowtail, tuna, white seabass, barracuda, marlin, and mako shark.

4.3.2.1 Wildlife Viewing

A national survey on recreation and the environment (conducted in 1999) estimated that more than 31.3 million people participated in some form of coastal and marine wildlife viewing or nature-based recreation in the U.S. (NOAA 2003a), while over 6.3 million participated in California (Leeworthy 2001). California ranked second only to Florida in terms of the overall number of participants engaged in marine recreation (over 22 million participants in Florida versus about 18 million in California). Most of the activities captured in this survey either directly or indirectly (visiting beaches, diving/snorkeling, kayaking/canoeing, photographing scenery) involved watching wildlife.

Wildlife viewing in the CINMS, especially whale watching, is popular due to the high frequency of sightings and diversity of marine life. Day trips are offered from several area landings including Santa Barbara, Ventura and Channel Islands harbors. In 1999, eight whale watch operations accounted for almost 26,000 person-days of activity and about $1.5 million in revenue from CINMS activity (Leeworthy and Wiley 2003).

4.3.2.2 Non-Consumptive Diving

The CINMS is considered to be one of the most sought after diving locations in the world. There is great interest in non-consumptive diving in the CINMS due to the diversity and beauty of the marine habitat, shipwrecks, and other underwater historical sites. Of the over 140 wrecks in the Channel Islands National Park and CINMS, 21 of these have been located and are popular dive sites. In 1999, seven charter operators accounted for almost 11,000 person-days of non-consumptive diving in the CINMS and earned approximately $685,000 in revenue (Leeworthy and Wiley 2003).

4.3.2.3 Boating, Sailing, Kayaking, and Surfing

Due to numerous protected anchorages and scenic coastlines, the CINMS is a sought-after destination for both sail and power boating. The northern Channel Islands are within reach of several ports for single or multiple day trips. Channel Islands, Ventura, and Santa Barbara Harbors contain over 5,000 slips used by recreational, commercial, and research vessels. Numerous vessels also traverse the region while in transit to other ports.

Due to abundant marine life and the presence of large sea caves and rock formations, the CINMS is considered a destination of interest for sea kayakers. Several regional operations offer sea kayaking excursions in the CINMS. Users can also take kayaks out to the islands on commercial or private vessels, and spend single or multiple days kayaking.

In 1999, eight for-hire operators provided over 4000 person-days of sailing in the CINMS, and four businesses provided over 1200 person-days of kayaking/and sightseeing in the CINMS. These operators received about $390,000 in revenue from this activity, which in turn generated over $797,000 in income and supported 24 full and part-time jobs in Ventura and Los Angeles counties (Leeworthy and Wiley 2003).

Surfing occurs year-round within the CINMS, but is generally most popular during the summer months. The number of surfers visiting the CINMS has risen steadily over the past several years, with the most popular destinations being closer to mainland ports.

4.3.3 Commercial Activities

The CINMS is an important area for commercial activities. A characterization of commercial activities associated with the CINMS marine area may be found in the CINMS Draft Management Plan/DEIS (NOAA 2006).

4.3.3.1 Fishing

Table 17 shows the baseline ex vessel value of landings by port and the percent of total port landings accounted for by catch from the CINMS. Ports in Santa Barbara, Ventura Harbor, Port Hueneme, and Channel Islands/Oxnard are the most dependent on catch from the CINMS. Details by species/species groups for ex vessel value of landings from the CINMS and the income generated by those landings can be found in Leeworthy and Wiley (2005).

Commercial fishing gear used in the CINMS includes nets, traps, lines, and dive equipment. The majority of target species are caught in nearshore kelp and rocky reef areas, which are also important habitat and production areas for other marine life. Key exploited species include squid, sea urchin, spiny lobster, prawn[15], nearshore and offshore finfishes (e.g., rockfishes and

[15] Prawn fisheries in the CINMS area include trawl and trap fishing for spot prawns and trawl fishing for ridgeback prawn. The California Fish and Game Commission closed the spot prawn trawl fishery in 2002.

California sheephead), coastal pelagic species (e.g., anchovy, sardine, and mackerel), flatfishes (e.g., California halibut, starry flounder, and sanddabs), rock crab, sea cucumber, tuna, and kelp. Live fish trapping for rockfish, California sheephead, California scorpionfish and other shallow water species occurs primarily near the coast of the CINMS. In addition, trap gear is used to take shrimp and prawns, California spiny lobster, and three types of rock crab (red, brown and yellow). Other fisheries include shark drift netting, squid seining, urchin diving, and diving or trawling for sea cucumbers. Most of California's commercial dive sea cucumber catch is from the northern Channel Islands (Leet *et al.* 2001). Abalone, once one of the most valuable fisheries in the CINMS (over $2.5 million harvested between 1988 and 1997 according to Leeworthy and Wiley 2003) and State, was closed to commercial harvest by the State legislature in 1997. There is a small but increasing fishery for turban snails and whelks, which is not currently regulated.

Market squid, sea urchin, spiny lobster, and halibut are some of the most economically valuable commercial fisheries landed in the CINMS, with urchin and squid exceeding the market value of all other species. Table 18 shows the commercial fishing average annual ex vessel value for the period 1996-2003. Table 18 also depicts the relative supply of selected CINMS commercial species.

Table 17 Commercial Fishing: Study Area Totals Ex Vessel Value by Port

Port	Value	%[1]
1. Moss Landing	$873	0.01
2. Morro Bay	$24,450	1.16
3. Avila/Port San Luis	$10,744	0.86
4. Santa Barbara	$4,533,549	60.95
5. Ventura Harbor	$2,926,906	60.25
6. Channel Islands	$1,892,045	47.45
7. Port Hueneme	$7,116,801	69.25
8. San Pedro	$840,497	7.34
9. Terminal Island	$725,340	5.41
10. Avalon & Other LA	$13,472	1.01
11. Newport Beach	$6,235	0.65
12. San Diego	$16,143	0.64

[1] Percents are the amount of ex vessel value as a percent of the total ex vessel value of landings at the Port (1996-2003 Average Annual Value), for all species groups, except Prawn, Rockfish and Tuna, which were valued using 2003 value of landings and CA Sheephead that was valued using the 2000-2003 average value of landings. Recent Trends in Vessels Operating in the CINMS and Dependence on CINMS

In 1999, there were 737 permitted vessels operating and reporting catch from the CINMS (Leeworthy and Wiley, 2003). In 2000, the number of permitted vessels reporting catch in the CINMS declined to 543, and in 2001 declined to 448 (Table 19). There are many permitted vessels that report catching small amounts of catch in the CINMS. In 1999, 18 percent of the

permitted vessels accounted for 82 percent of the total ex vessel value of landings from the CINMS (Leeworthy and Wiley, 2003). In 2003, 23 percent of the permitted vessels accounted for 78 percent of the total ex vessel value of landing from the CINMS. In 2003, 90 vessels (20.4%) reported catching less than $1,000 worth of total landings from the CINMS and 179 vessels (40.59%) reported catching less than $5,000 worth of landings from the CINMS (Table 20).

Table 18 Commercial Fishing, Marine Reserves Study Area Totals - Avg ExVessel Value 1996-2003

	Value	Percent	$$ (Excl Kelp)	% (Excl Kelp)
Species/Species Group				
Squid	10,788,355	44.52	10,788,355	59.14
Kelp	5,991,367	24.72	0	0.00
Urchins	4,320,544	17.83	4,320,544	23.68
Spiny Lobster	1,024,536	4.23	1,024,536	5.62
Prawn [1]	210,978	0.87	210,978	1.16
Rockfish [1]	152,892	0.63	152,892	0.84
Crab	414,732	1.71	414,732	2.27
Tuna [1]	3,085	0.01	3,085	0.02
Wetfish	474,251	1.96	474,251	2.60
CA Sheephead [2]	155,290	0.64	155,290	0.85
Flatfishes	218,328	0.90	218,328	1.20
Sea Cucumbers	222,007	0.92	222,007	1.22
Sculpin & Bass	93,203	0.38	93,203	0.51
Shark	34,397	0.14	34,397	0.19
sub-total (counted)	**24,103,965**	**99.47**	**18,112,598**	**99.29**
Others Not Included				
Abalone [3]	0	0.00	0	0.000
Swordfish	50,087	0.21	50,087	0.275
Roundfish	32,736	0.14	32,736	0.179
Others	22,493	0.09	22,493	0.123
Yellowtail	8,066	0.03	8,066	0.044
Shrimp	3,505	0.01	3,505	0.019
Mussels & Snails	5,819	0.02	5,819	0.032
Salmon	5,119	0.02	5,119	0.028
Rays & Skates	993	0.00	993	0.005
Surf Perch	412	0.00	412	0.002
Grenadiers	106	0.00	106	0.001
Octopus	105	0.00	105	0.001
sub-total (not counted)	**129,441**	**0.53**	**129,441**	**0.710**
sub-total, excluding Abalone	**129,441**	**0.53**	**129,441**	**0.710**
Total All Species/Species Groups	**24,233,406**	**100.00**	**18,242,039**	**100.000**
Total All Species/Species Groups excluding Abalone	**24,233,406**	**100.00**	**18,242,039**	**100.000**

1. Prawn, Rockfish and Tuna values are 2003 values due to steep declining trends.
2. CA Sheephead value is the 2000-2003 average.
3. Abalone value is the 2000-2003 average since Abalone harvest has been prohibited since 1997.

Dependence on CINMS, measured as percent of total fishing revenues from the CINMS, has declined since 2000. In 2000, the vessels reporting catch from the CINMS caught over 79 percent of the total value of their landings from California from the CINMS (Table 19).

Table 19 Commercial Fishing Revenue from CINMS, 2000-2003

Year	Number of Operations[1]	Value from CINMS ($)	Value from ALL CA ($)	% of Value from CINMS
2000	543	21,627,775	27,257,770	79.35
2001	448	13,000,830	36,493,318	35.63
2002	458	12,074,375	35,029,852	34.47
2003	441	17,274,785	36,230,249	47.69
2000-2003 Average	473	15,994,441	33,752,797	47.39

1. Number of Fishing Operations are number of different vessel identification numbers in the CDFG trip ticket database

This percentage declined to less than 36 percent in 2001 and rose again to over 47 percent in 2002 and 2003. In 2000, 47.7 percent of vessels that reported catch from the CINMS depended on the CINMS for 100 percent of their total fishing revenues. The percentage has steadily declined from 2000 to 2003, and in 2003, only about 15 percent of vessels reported catching 100 percent of their fishing revenues from the CINMS.

Table 20 All Species in CINMS - 22 Block Definition, 2003

Value	Number of Fishing Operations	Percent of Fishing Operations	Sum of 2003 Ex Vessel Value	Percent of 2003 Ex Vessel Value
GT $0	441	100.00	17,276,739	100.00
GE $500,000	3	0.68	1,617,339	9.36
GE $100,000	43	9.75	9,272,657	53.67
GE $50,000	102	23.13	13,488,582	78.07
GE $20,000	175	39.68	16,026,395	92.76
LT $20,000	266	60.32	1,250,344	7.24
LT $10,000	223	50.57	596,145	3.45
LT $5,000	179	40.59	271,006	1.57
LT $1,000	90	20.41	38,316	0.22

4.3.3.2 Kelp Harvesting

For over 50 years, giant kelp harvesting occurred near Point Conception, San Miguel Island, Santa Rosa Island and near Point Mugu and was, prior to 2005, another of the CINMS's most valuable harvested species. In 1999, kelp harvested from the CINMS had a processed value of about $6 million (Leeworthy and Wiley 2003). Commercial kelp harvesting ended in 2005 for economic reasons. The surface canopy of kelp forests was formerly harvested several times

annually (Kimura and Foster 1984; CDFG 2002). The kelp canopy serves as important habitat for juvenile fishes (Carr 1989) and many species of invertebrates (Coyer 1979; Watanabe 1984).

4.3.4 Department of Defense/Homeland Security Activities

The US military maintains a strong presence in the greater CINMS marine area. The US Air Force and US Navy, individually and together, conduct training exercises, and support military testing and evaluation projects for aircraft, ship, and missile programs. Both support commercial space launch missions as well. The Vandenberg Air Force Base (VAFB), Point Mugu Sea Range and Port Hueneme coastal and marine areas are the primary locations for these military activities.

VAFB, located in western Santa Barbara County, is headquarters for the US Air Force's 30th Space Wing. The Air Force's primary missions at VAFB are to launch and track satellites in space, test and evaluate America's intercontinental ballistic missile systems and provide aircraft operations in the Western Range. VAFB also supports commercial space launch ventures and supports aircraft and helicopter training and testing.

In addition to mainland facilities, Point Mugu encompasses a 36,000 square mile Sea Range that supports five categories of tests to evaluate sea, land and air weapons systems: 1) air-to-air testing; 2) air-to-surface testing; 3) surface-to-air testing; 4) surface-to-surface testing; and 5) subsurface-to-surface testing. In addition, the Sea Range supports fleet training exercises, small-scale amphibious warfare training and special warfare training.

The US Coast Guard (USCG), which operates a Marine Safety Detachment and Coastal Patrol Boat at Santa Barbara, California and a Station and Coastal Patrol Boat at Oxnard, California, conducts several activities in the CINMS region, such as search-and-rescue, migrant and drug interdiction, fisheries enforcement, marine environmental protection, marine mammal protection and monitoring and inspection of all international vessels experiencing mechanical difficulty and distress.

4.3.5 Research Activities

Collaboration in research activities is a central programmatic focus of the CINMS. The CINMS is the subject of extensive scientific interest as numerous academic and professional researchers conduct research activities that have led to project specific articles, academic papers, and other products. The CINMS includes key reference sites for scientific investigations. The designation of marine reserves within State waters (CDFG 2002) is an important part of the collaborative research that is occurring in the CINMS.

Research activities fall under the following general categories: physical and biological science research; socioeconomic, cultural, and historic research; and political science research. The CINMS staff are important participants and collaborators in marine science and socioeconomic

research. Research activities that pertain to the CINMS's physical and biological setting are the most extensive.

Abeles *et al.* (2003) provide a comprehensive assessment of major physical and biological science research activities in the CINMS to date, with a focus on studies that include a long-term monitoring component. The Abeles *et al.* (2003) report categorizes 42 research projects in the CINMS according to ecological levels of classification: population studies (marine plants, marine invertebrates, marine fish, marine birds, marine mammals), community studies, environment studies, and ecosystem studies.

Other research and data collection supported by the CINMS and partners include participation in annual ocean and coastal conferences and meetings, and assistance in biological surveys, including a current baseline population study on Xantus' murrelets.

The CINMS R/V Shearwater is used primarily for research, and serves as a host for educational field trips and emergency response in and around the CINMS. The Shearwater also includes wet and dry labs that allow on-board processing of samples and data. Extensive dive operations are supported by onboard facilities and equipment.

4.3.5.1 Biological Monitoring Programs

A characterization of existing monitoring programs is depicted in Abeles *et al.* (2003). These monitoring programs are developed and implemented by the CDFG, NOAA's Southwest Fisheries Science Center, Channel Islands National Park, the University of California, Santa Barbara (UCSB) Marine Science Institute, and a number of other scientific organizations. Additional information on the monitoring programs is provided in Appendix F: Marine Reserves Management Framework, and in the CINMS Draft Management Plan (NOAA 2006).

A variety of economically and ecologically important species are studied, such as sea urchin, abalone, sea bass, rockfish, seabirds, pinnipeds, and humpback and blue whales. Several programs monitor marine communities. Research programs have been established to monitor communities on sandy beaches and lagoons, rocky intertidal habitats, kelp forests, subtidal rocky reefs, soft bottom habitats, and in the open ocean. Research programs that monitor community dynamics generally include surveys of the common species that occur in a particular habitat. Several research programs attempt to monitor ecosystem dynamics, including both physical and biological variables. Recent efforts within the CINMS have emphasized seabird research, and collecting baseline data for emerging management issues.

4.3.5.2 Socioeconomic, Cultural, and Historic Research

A complete characterization of socioeconomic, cultural, and historic research associated with the CINMS is found in the CINMS Draft Management Plan/DEIS (NOAA 2006). Research activities that pertain to the CINMS's human setting include socioeconomic studies of industries

and individuals linked to the CINMS, as well as studies of maritime and historic resources. Socioeconomic studies of consumptive and non-consumptive use of the CINMS have not been as extensive as other research projects that focus on physical science. However, since the CDFG and NMSP initiated the Channel Islands Marine Reserve Process, several socioeconomic studies have been completed and a socioeconomic monitoring program is being developed and implemented.

Maritime heritage resource research is focused on studies of Native American artifacts, paleontological remains, or historic studies of shipwrecks, aircraft wrecks, and material associated with wharves, piers and landings. The CINMS (NMSP), and major partners, such as the CINP, the Santa Barbara Maritime Museum, the State of California, Coastal Maritime Archaeology Resources (CMAR), and the Chumash Maritime Association, conduct the majority CINMS maritime heritage activities and research.

4.3.6 Educational Activities

Educational activities are a central programmatic focus of the CINMS. The CINMS plays an important role in public and formal marine science education activities for all ages, from K-12 to adults. CINMS educational activities have reached a wide variety of audiences on a local, regional, national, and international scale. CINMS educational activities are focused in two strategic areas: 1) community involvement, partnerships, and community program development and 2) educational products and services.

Community involvement is an essential component of the CINMS Education and Outreach Program. It is achieved in large part through the Channel Islands Naturalist Corps, which is a volunteer corps of naturalists trained to provide interpretation about the CINMS and Channel Islands National Park on a variety of passenger vessels, such as whale watch and dive boats, as well as at outreach and special events. Community involvement in educational activities is also achieved through the Sanctuary Advisory Council and in particular its Sanctuary Education Team. This team is made up of community members who work to address CINMS education needs, and to keep local educational institutions informed about CINMS educational opportunities. Sanctuary Advisory Council members at large are charged with keeping their constituents educated about the CINMS. Community involvement in educational activities is also achieved through participation in CINMS events and programs.

The CINMS and partners have developed and implemented numerous interactive educational programs including training programs, workshops, special events, and school programs. The CINMS Education staff present workshops and programs at a variety of regional and national conferences each year, such as the Southwest Marine Educators Association, California Science Teachers Association and National Marine Educators Association. Training programs and teacher workshops teach educators about marine science using the CINMS as subject matter, and many are linked to CINMS products such as curriculum packages and CD-ROMs. Other workshops target a broader segment of the community, such as the Marine Wildlife Viewing

Workshop that is open to all members of the public interested in responsible wildlife viewing practices. Each year, the CINMS (NMSP) sponsors a variety of public educational cruises targeting varying audiences including local residents, tourists, school children and community groups. These cruises provide field experiences in the CINMS and may include activities such as: intertidal and sandy beach monitoring, floating labs, students on research vessels posing questions to divers below using live video and audio feed, kayaking, diving, and wildlife viewing. CINMS(NMSP) staff and volunteers facilitate hands-on activities such as oceanography experiments, fish identification, marine mammal and seabird identification, fish surveys, and wildlife viewing to encourage an understanding and stewardship for CINMS resources. The CINMS and its partners also support marine science programs in local schools such as Los Marineros and the Channel Islands Argonauts.

Educational activities are also provided at community programs such as whale festivals, harbor festivals, boat shows, and dive industry events that are held in the region. Additional information on education activities in the CINMS can be found at the "Marine and Coastal Educational Resources Directory."[16]

4.4 Management

Numerous Federal regulations and State laws apply to the CINMS. A complete characterization of Federal and State regulations may be found in the CINMS Draft Management Plan/DEIS (NOAA 2006). Appendix F describes the existing Federal and State regulations associated with fisheries management and plans within the CINMS. Section 3.0 of this DEIS also provides information on the existing Cow Cod Conservation Area and the California Rockfish Conservation Area within the CINMS.

[16] Available at http://www.coastal.ca.gov/publiced/directory/resdirectory/rdindex.html

5.0 ENVIRONMENTAL IMPACTS

This section describes the ecological and socioeconomic impacts associated with the proposed action and alternatives (Sections 5.1 and 5.2 respectively). It also presents considerations for managing the proposed network of marine zones under each of the alternatives (Section 5.3).

5.1 Ecological Impacts

This EIS analyzes the impacts of networks of marine zones in the CINMS. In general, the NMSP expects the proposed action to establish marine zones in the CINMS to have positive or beneficial ecological impacts[17] by protecting marine habitats and species and their ecological interactions and processes from human influences.

Adverse ecological impacts are unlikely within the marine zones because the regulations would prohibit or limit take of Sanctuary resources and disturbance to marine habitats that sometimes occurs when those resources are taken. There may be some potential negative impacts on surrounding resources resulting from the displacement of fishing activity from the marine zones to adjacent areas. If fishing is concentrated in areas adjacent to marine zones, habitat alteration from gear impacts may increase in those areas. It remains to be seen whether the impact will be mitigated or exacerbated by existing fishing regulations and spillover of targeted species into adjacent areas. However, vessel distribution and socioeconomic analyses indicate that relatively little activity occurs within the proposed marine zones. Hence, little fishing activity congestion is expected as a result of implementing either spatial alternative.

This section describes the impacts to the CINMS ecosystem the NMSP expects will occur as a result of the proposed action. The impacts of the proposed action and the alternatives are described both individually and cumulatively in the following manner:

- Analysis of the ecological impacts of marine reserves in general;
- Analysis of the ecological impacts of the no action alternative;
- Analysis of the ecological impacts of Alternatives 1 and 2; and
- Analysis of the cumulative ecological impacts.

5.1.1 Ecological Consequences Of Marine Reserves In General

Fully protected marine reserves are likely to have significant positive ecological consequences for species of interest, particularly those that are targeted by commercial or recreational fisheries.

[17] For purposes of this analysis, beneficial impacts are those that are expected to further the NMSP's goals to objective of achieving a natural assemblage of living resources of the CINMS restore and enhance the abundance, density, population age structure, and diversity of the natural biological communities, and to , restore, and maintain functional and intact portions of natural habitats (including deeper water habitats), populations, and ecological processes in the Sanctuary and meet the proposed action's goals.

A meta-analysis of the ecological impacts of marine reserves indicates substantial increases in the biomass, abundance, body size, and diversity of focal species (Halpern 2003, Palumbi 2003). Similar ecological benefits have been observed for some species, including cowcod, bocaccio, kelp bass, California sheephead, spiny lobster, warty sea cucumber, and red urchin, protected in marine reserves (or de facto marine reserves) in the Channel Islands region (Schroeder and Love 2002, J. Caselle, unpublished data).

There is abundant evidence to demonstrate that protecting areas from all extractive activities in marine reserves leads to rapid increases in abundance, size, biomass, and diversity of targeted animals, regardless of where in the world reserves are located. Halpern (2003) reviewed 56 studies of 80 reserves that were protected from at least one form of fishing. He derived aggregate measures of reserve performance, by combining responses of all the organisms studied for each of four variables: abundance, total biomass, average body size, and species diversity. Across all reserves, abundance (measured as density) approximately doubled. Biomass, or the weight of all organisms combined, increased 2.5 times in reserves as compared to fished areas. Average body size of organisms protected in marine reserves increased by approximately 30%. The increase in size contributes to greater reproductive potential (Béné and Tewfik 2003). In addition to changes in biomass, abundance, size, and reproductive potential, the number of species in each sample increased by 30%. These ecological effects were expressed in both temperate and tropical regions (Halpern, 2003).

Ecological changes have been detected rapidly (within 1 year) in regions of high nutrient input due to upwelling (Fisher and Franks 2002, Witman and Smith 2003). Responses documented by Halpern (2003) occurred, on average, 3-5 years after reserves were established. Ecological effects of marine reserves were detected regardless of reserve size (Halpern 2003). Abundance, size, biomass and diversity of targeted species increased in small as well as large reserves. However, there are usually greater absolute differences for larger reserves (Halpern 2003).

5.1.1.1 Effects on Targeted Species

Marine scientists have documented the ecological consequences of marine reserves for numerous species in California, including some of the species of interest identified by the MRWG and the SAP (Airame 2000). Studies of marine reserves in California provide some insight into the potential ecological consequences of marine reserves and other protected areas in the CINMS.

Paddack and Estes (2000) found mean densities for a variety of rockfish and other species 12-35% greater (all species combined) within three central California reserves (Hopkins Marine Life Refuge, Pt. Lobos Ecological Reserve, and Big Creek Marine Resources Protection Act Ecological Reserve) than adjacent fished areas. In their study, average densities for kelp rockfish, gopher rockfish, cabezon, and lingcod were 31%, 83%, 22% and 100% greater inside the marine reserves than outside, respectively. California sheephead were much more abundant within one reserve in the study, but very infrequent or not seen at all in other areas.

Paddack and Estes (2000) also reported mean sizes for all rockfish species combined in their study. In two of the three reserves, mean size was greater and in the third reserve (which had been established the least amount of time) mean size was nearly equal. On average, over all three reserves, mean size of rockfishes was about 14% greater within the reserves than outside. Table 21 below shows average densities and sizes of targeted species in marine reserves in California as compared to fished areas nearby.

Table 21 Average Densities and Sizes of Targeted Species in Marine Reserves within the State Of California as Compared to Fished Areas Nearby

Species	Status	Average Density	Average Size
California sheephead	Targeted	More abundant within range	
Kelp rockfish	Targeted	31% greater	14% larger
Gopher rockfish	Targeted	83% greater	14% larger
Cabezon	Targeted	22% greater	14% larger
Lingcod	Targeted	100% greater	

Data from Paddack and Estes (2000) from Hopkins Marine Life Refuge, Pt. Lobos Ecological Reserve, and Big Creek Marine Resources Protection Act Ecological Reserve.

Increases in abundance and density of targeted species also have been detected in marine reserves in the Channel Islands. Limited data were available from surveys inside and outside the Catalina Marine Science Center Reserve. The densities of sheephead and kelp bass were 48% and 29% greater, respectively, inside the reserve compared to outside (Caselle, unpublished data). In 2000-2001, the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) compared sites inside the Anacapa Island Ecological Reserve Natural Area with one site outside the reserve at Middle Anacapa Island (Caselle, unpublished data).[18] For estimates of density, the site inside the reserve with similar habitat was compared to the site outside the reserve, whereas all sites were used for estimates of average size. Sheephead and kelp bass densities were 137% and 103% greater, respectively, inside the marine reserve compared to outside. Sheephead and kelp bass average sizes were 13% and 9% greater, respectively, inside the marine reserve compared to outside.

The National Park Service compared relative densities and sizes of invertebrate species inside the Anacapa Ecological Reserve Natural Area and areas nearby (Kushner unpublished data). In all cases, data was analyzed from particular sites only if the focal species were present in more than 2 out of the most recent 10 years of data. In this analysis, average spiny lobster and warty sea cucumber densities were 592% and 141% greater inside the reserve, respectively. In contrast, average red urchin densities were 13% less inside the reserve. Although red urchins

[18] Dr. Jennifer Caselle (UCSB) is a marine scientist who assisted in designing and conducts biological monitoring of the State marine zones since 2003.

were less dense inside the reserve, individual urchins were significantly larger inside the reserve. Red urchins were approximately 60% larger inside the reserve compared to areas outside. In addition, while nearly 60% of red urchins were larger than the minimum legal commercial size inside the marine reserve on average, only about 11% were outside. Table 22 shows average densities and sizes of targeted species in marine reserves within the Channel Islands as compared to fished areas nearby.

Schroeder and Love (2002) compared rockfish density within a de-facto marine reserve (an oil platform where fishing does not occur), an area allowing only recreational fishing, and an unprotected area (where both recreational and commercial fishing are allowed) in the Channel Islands region. Rockfish density was an order of magnitude less within the recreational fishing area than in the unprotected area. Community composition also was significantly different. Cowcod densities were 8 and 32 times greater in the de facto reserve than in the recreational area or unprotected area, respectively. Similarly, bocaccio densities within the de facto reserve were 18 and 408 times greater than in the recreational area or unprotected area, respectively. The authors conclude that recreational fishing in a marine conservation area can have measurable negative effects on targeted species' abundances and densities.

Table 22 Average Densities and Sizes of Targeted Species in Marine Reserves within the Channel Islands

Species	Status	Average Density	Average Size
Cowcod[1]	Targeted	32 and 8 times greater	
Bocaccio[1]	Targeted	408 and 18 times greater	
Kelp bass[2]	Targeted	103% greater	9% larger
Kelp bass[3]	Targeted	29% greater	
California sheephead[2]	Targeted	137% greater	13% larger
California sheephead[3]	Targeted	48% greater	
Spiny lobster[4]	Targeted	592% greater	
Warty sea cucumber[4]	Targeted	141% greater	
Red urchin[4]	Targeted	13% less	60% were larger than legal size

[1] Data from Schroeder and Love (2002) showing the density of populations in a de-facto reserve (Platform Gail) as compared to a recreational fishing area and an unprotected area.
[2] Data provided by PISCO from the Anacapa Ecological Reserve Natural Area.
[3] Data provided by PISCO from the Catalina Marine Science Center reserve.
[4] Data provided by NPS from the Anacapa Ecological Reserve Natural Area.

5.1.1.2 Effects on Non-targeted or Non-fished Species

Establishing a reserve is not likely to affect the abundance, density and size distribution of non-targeted species if they are not impacted directly (e.g., bycatch) by fishing. However, establishing a reserve may impact non-targeted species if strong ecological linkages (e.g., predation or competition) exist between non-targeted species and others that are fished. The range of ecological responses of non-targeted species to protection within reserves demonstrates the importance of indirect effects.

In 2000-2001, PISCO investigated the differences between non-targeted species in the Anacapa Ecological Reserve Natural Area and fished areas nearby. Table 23 depicts the average densities and sizes of unfished species in the reserve. Rock wrasse, garibaldi, and black surfperch densities were 173%, 79%, and 398% greater inside the reserve at Anacapa Island compared to outside, respectively. Rock wrasse average size was 3% greater inside the reserve compared to outside, respectively. Garibaldi and black surfperch average sizes, however, were 4% and 24% smaller inside the reserve compared to outside, respectively. The research highlights the varying effects of marine reserves on non-targeted species.

National Park Service data (Kushner unpublished data) were examined to compare relative densities and sizes of non-targeted invertebrate species inside the Anacapa Ecological Reserve Natural Area with areas nearby. Average purple urchin, bat star, and giant-spined star densities were 91%, 66%, and 77% less inside the reserve, respectively. Although densities of purple urchins were less within the reserve, these individuals were, on average, larger (26%) than those found outside the reserve.

Table 23 Average Densities and Sizes of Unfished Species in the Anacapa Ecological Reserve Natural Area As Compared To Fished Areas Nearby

Species	Status	Average Density	Average Size
Rock wrasse[1]	Unfished	173% more	3% larger
Garibaldi[1]	Unfished	79% more	4% smaller
Black surfperch[1]	Unfished	398% more	24% smaller
Purple urchin[2]	Unfished	91% less	26% larger
Bat star[2]	Unfished	66% less	
Giant-spined star[2]	Unfished	77% less	

[1] Data provided by PISCO.
[2] Data provided by NPS.

The differences between ecological responses in the reserve as compared to surrounding waters indicate that indirect effects of reserves impact non-targeted species, sometimes in unexpected ways. Declines in abundance, density, or size of non-targeted species within a reserve may result from increases of one or several predators, which now exert predation pressure, causing the non-targeted species to decline. Increases in abundance or density of non-targeted species within a reserve may be a result of reduced competition for resources as food production within the reserve increases over time.

Complex indirect interactions, resulting from fishing and the subsequent establishment of a no-take marine reserve, have been documented in the Channel Islands region. Historically, lobsters and other predators kept sea urchin populations in the Channel Islands at low levels and kelp forests flourished. However, lobster fishing has occurred in the Channel Islands region for over 100 years (Leet *et al.* 2001). Over time, commercial and recreational fisheries for lobster reduced the population size and average length of individual lobsters.[19] Reduced populations of smaller lobsters were less effective predators on urchins and, as a result, urchin populations increased. Intense grazing by purple urchins (which were not fished) caused dramatic declines in kelp growth, leading to the formation of bare rocky reefs covered with urchins (known as urchin barrens). It is believed that reduced growth of kelp during El Niño events, combined with the effects of grazing by urchins, contributed to massive reductions in the areas covered by kelp forests. At some point during the past 20 years, each kelp forest monitoring site (supported by the National Park Service) in fished areas of the Channel Islands became an urchin barren for a period of time and urchin barrens have persisted at some sites (Behrens and Lafferty 2005).

In contrast, kelp forests protected in the Anacapa Ecological Reserve Natural Area were resilient during a period of twenty years since the reserve was established (Behrens and Lafferty 2005). In spite of natural perturbations, such as El Niño, kelp forests persisted in the reserve. The kelp forest may have persisted in the reserve, in part, because the grazing pressure by urchins was reduced as natural predators, such as large lobsters, returned. As noted above, lobsters were 6 times more abundant and larger in the Anacapa Ecological Reserve Natural Area than in surrounding waters.

The time to detect ecological changes in marine reserves and the magnitude of those changes depends, in part, on the intensity of historical fishing effort in the region (Coté *et al.* 2001). Changes will occur rapidly in areas that recently experienced high fishing intensity, provided that some individuals of the targeted species remain or a source of larvae is nearby. In the Channel Islands region, ecological changes are expected to occur more rapidly in the eastern islands (Anacapa and Santa Cruz Islands), where commercial and recreational fishing has been concentrated for a long period of time. Ecological responses are likely to be more subtle around the western islands (Santa Rosa and San Miguel Islands), where the intensity of recreational fishing has been lower. Exceptions may be certain commercial fisheries, including sea urchin, crab, and rockfish, that are concentrated around the western Channel Islands. In addition,

[19] Tegner and Levin (1983) quantified the same trend from landings at the San Diego Pier.

ecological responses are likely to be more rapid in shallow waters near shore, where fishing is concentrated in the highly productive euphotic zone. Ecological responses may be more subtle in deep waters offshore where fishing effort is limited by access. Species that are not fished or very lightly fished are not expected to show significant changes in abundance and size as a result of reserve establishment.

5.1.1.3 Effects on Pelagic Species

Potential effects of marine reserves on pelagic species are discussed in Section 3.1.2.2. Protection of species such as thresher and mako sharks, tuna, billfish, sardine, anchovy, and mackerel while within marine reserves may have positive ecological impacts. Further, some species, such as halibut, lingcod and kelp bass, are primarily associated with benthic habitats, but they often move into the pelagic zone to look for food. These species may be captured in midwater by some types of fishing gear, including hook and line. Halibut, lingcod, and kelp bass are apex predators, whose removal from the ecosystem may have important ecological consequences for benthic and midwater communities. Generally, removal of apex predators from an ecosystem leads to cascading ecological effects through lower trophic levels.

Fishing pelagic species outside of marine reserves will have ecological impacts on ecosystems both outside and potentially inside the reserves. Because pelagic species may move long distances, they may spend some time in areas where they are vulnerable to fishing and areas where they are protected. If such species are removed from the ecosystem by fishing, the interaction between these apex predators and other species within the protected areas will be diminished or eliminated. Estimates of the biomass of apex predators already removed from the world's oceans are approximately 90% (Myers and Worm, 2003). Such removal of apex predators may shift ecological systems from top-down (predator) control to bottom-up (production) control. Marine reserves provide some additional protection for pelagic species while they are within reserves, potentially contributing to overall survival and persistence of these populations.

5.1.2 Ecological Impacts of the No Action Alternative

As mentioned above, many species and habitat types are currently protected from take under the State marine zones and other regulatory actions. Under the no action alternative, the NMSP expects many of the trends (both positive and negative) discussed in Section 4.0 to continue into the future. In particular, the long term decline in the overall health of the SCB and decline in several targeted species is expected. Furthermore, increases in coastal population, demands for seafood products, and demands for recreational opportunities result in greater stresses on the CINMS region. Without additional comprehensive protection in deeper water habitats there would be no reference sites to help gauge impacts and better understand the dynamics of the CINMS region.

5.1.3 Ecological Impacts of Alternative 1a and 1b[20]

The proposed marine zones in Alternatives 1a and 1b are expected to have positive ecological impacts by protecting (from fishing or other forms of take) marine habitats and species and their ecological interactions and processes. The impacts of Alternatives 1a and 1b are expected to be similar to the description of the impacts of marine reserves in general identified above. While difficult to quantify in absolute terms, the NMSP expects to realize more benefits with Alternatives 1a and 1b as compared to the no action alternative. The ecological impacts of Alternatives 1a and 1b would occur over larger areas as compared to the impacts of the no action alternative (only having the State marine zones). Negative ecological impacts are unlikely in marine zones that prohibit or limit disturbance to marine habitats and take of natural biological populations.

Alternatives 1a and 1b include proposed marine zones in each of the biogeographic regions, including the Oregonian Province, the Californian Province and the transition region between them. Unique suites of physical and oceanographic characteristics and unique assemblages of species define each biogeographic region. By protecting a portion of each biogeographic region, Alternatives 1a and 1b are likely to contribute to increased abundance, individual size, biomass, and diversity of the majority of targeted species within the study region. Species of interest depend on marine habitats for shelter, spawning sites, nursery areas, and foraging sites. Protection of marine habitats in the existing State marine protected areas and fishery closures, proposed essential fish habitat and Alternative 1a will contribute to protection, restoration and maintenance of abundance, density, age structure and diversity of natural biological populations in the Channel Islands region. The proposed marine zones in Alternatives 1a would not fully mitigate some potentially negative impacts to marine habitats, such as anchoring and ghost fishing gear.

Areas of particular ecological importance in the proposed essential fish habitat and Alternative 1a and 1b are:

- Medium to high relief rocky reefs around Richardson Rock support numerous groundfish species, including yellowtail, olive, and vermilion rockfish and lingcod;
- Submerged rocky reefs around Gull Island support depleted populations of abalone and rockfish, including blue and vermilion rockfish, bocaccio and various Sebastomas spp;
- The Footprint supports depleted populations of numerous rockfish species, including bank and gilleye rockfish, cowcod, lingcod, thornyhead, and sablefish.

Alternatives 1a and 1b include pelagic habitats that are not protected within the proposed essential fish habitat measures. These pelagic habitats are used by highly migratory species, including sharks, tunas, billfish, and swordfish, and coastal pelagic species, including sardines,

[20] Because the marine zones proposed for the Federal waters in Alternatives 1a and 1b are identical, the ecological impacts identified in this section are the same for each Alternative.

anchovy and mackerel. Some species that are typically associated with benthic habitats, such as lingcod, halibut, and kelp bass, also use midwater habitats for foraging. Protecting pelagic habitats will allow the natural ecological processes between these apex predators and their pelagic or benthic prey.

Habitat replication in protected marine zones is important to increase the likelihood that habitats and associated species will be protected in a dynamic and unpredictable environment. Alternatives 1a and 1b include excellent replication of soft sediments in more than 3-5 protected zones on the continental shelf and slope. Species associated with soft sediments, such as halibut, sole, and flounder, are likely to thrive in the proposed marine zones and if one or more protected populations is impacted by a localized disturbance, other protected populations would likely persist. The replication of protected marine habitats may offer increased ecological resilience for associated species. Neither alternative provides sufficient replication of rocky habitats at all depth intervals. Low (or no) replication of protected rocky habitats will leave species associated with these habitats, such as rockfish, lingcod, and lobster, vulnerable to unpredictable disturbances and environmental fluctuations. The more natural density, and size and age structure found in a protected population may be lost in a single localized disturbance if multiple protected sites do not exist (Allison *et al*. 2003).

To provide any significant protection for a species of interest, the size of individual zones must be large enough to encompass the typical movements of many individuals. Current data on adult fish movement patterns suggest that marine zones spanning 5-20 km (2.6-10.5 nmi) of coastline are likely to contribute to the protection of these species. Marine zones spanning less than 5 km (2.6 nmi) in width may leave many individuals of important species poorly protected. The average width (short axis) across marine zones in Alternatives 1a and 1b is 3.1 nmi with a range of 1.0 nmi at Anacapa Island MR and MCA to 6.8 nmi at Richardson Rock MR. The regions around Santa Rosa Island, south side of San Miguel Island and the north sides of Santa Cruz and Anacapa Islands, are not well represented in marine zones proposed in Alternatives 1a and 1b. Species with short-distance adult dispersal, such as cabezon, white croaker, and numerous rockfish species including cowcod, black and yellow, brown, calico, china, copper, flag, gopher, glass, greenblotched, greenspotted, kelp, olive, vermilion, and yelloweye rockfish, are likely to benefit from protection within moderate to small marine zones. However, species with moderate to long-distance adult dispersal, such as longspine thornyhead, lingcod, canary rockfish, white seabass, and shiner surfperch, are likely to move outside of protected zones into areas where they are vulnerable to fishing.

In order to function as an ecological network, the spacing between marine protected habitats must be consistent with the potential for larval dispersal. It is important to consider the distances between similar types of protected habitats because species tend to be associated with particular habitat characteristics. For marine zones to be within dispersal range for most commercial or recreational groundfish or invertebrate species, they will need to be spaced on the order of no more that 50-100 km (26.3-52.5 nmi) apart. There is a large (35 nmi) gap between marine zones

proposed in Alternatives 1a and 1b, between Harris Point MR (San Miguel Island) and Scorpion MR (Santa Cruz Island). One potential negative ecological consequence of this gap could be reduced connectivity between marine zones across the northern Channel Islands. Low connectivity between protected marine zones will tend to isolate protected populations, reducing the regional sustainability of natural biological populations. Because of its remote location, Santa Barbara Island MR is likely to have the least ecological connection to other marine zones around the northern Channel Islands. The distance between South Point MR and Santa Barbara Island MR is likely to be too far for effective ecological exchange. However, there is potential for exchange of larvae between Santa Barbara Island MR and three of the other marine zones proposed in Alternatives 1a and 1b , including Gull Island MR, the Footprint MR, and Anacapa Island MR. The limited number of connections (1 or 2) in Alternative 1 between protected patches of rocky substrate at all depth intervals may limit the ecological connectivity among marine zones proposed in this alternative.

5.1.4 Ecological Impacts of Alternative 1c

Many of the ecological impacts identified for Alternatives 1a and 1b apply to Alternative 1c. However, because the boundaries of the proposed marine zones in Alternative 1c would terminate at the existing State-Federal waters boundary (3 nmi from shore), Alternative 1c would result in gaps of unprotected waters between most of the proposed Federal marine zones and the existing State marine zones (most of the existing State marine zones do not come all the way to State-Federal waters boundary). Such gaps would represent areas that provide no additional protection to a certain species and habitats.

Alternative 1c gaps exist at Richardson Rock, Harris Point, South Point, Gull Island, Scorpion, and the Footprint. The gaps comprise about 25 nmi^2 and reduce the total area of Alternative 1a and 1b from 241.1 nmi^2 to about 213 nmi^2. About 5% of the alternative's hard sediment habitats occur within the gaps, which include rocky reefs and canyons. These habitats occur within deeper waters of the continental shelf and slope. Further, although Alternatives 1a and 1b contains less than 1 nmi^2 of hard sediments within the deep continental shelf, a majority falls within the gaps that occur at Richardson Rock and the Footprint. These submerged rocky reefs areas provide habitat for various groundfish species, including yellowtail, olive, vermilion, and blue rockfish, lingcod, boccaccio, and abalone.

Conversely, most of the soft sediment habitats contained within the gaps occur in the Sanctuary's continental shelf and continental slope habitats. About 8% of Alternative 1a and 1b's soft sediment habitats occur within the gaps. Species typically found within the Sanctuary associated with soft sediments include halibut, sole, and flounder.

Although many species are primarily associated with a single habitat, they may utilize a variety of different habitat types during their life history stages. It is common for individuals to use different habitat types at different stages of their life cycles. For example, larvae may drift in the water column, juveniles may settle into shallow water, and adults may inhabit deeper water. In

some cases, individuals use several different habitat types during one stage of their life cycle and can move between shallow and deeper habitats, which span their home ranges.

Marine zones that provide continuous protection across a range of shallow to deep water habitats may result in greater ecosystem protection. Marine zones that extend offshore and provide continuous spatial protection are more likely to accommodate individual movement and protect individuals over their lifetime. They reduce the probability of mortality resulting from species moving across gaps that contain habitats within their home ranges and across life history stages. Hence, gaps may reduce the connectivity of Alternative 1a or 1b and expose species to extractive and incidental mortality, resulting in reduced ecological benefits relative to full ecosystem protection offered by the other Alternatives.

5.1.5 Ecological Impacts of Alternative 2

Alternative 2 shares all of the ecological impacts identified above for Alternatives 1a and 1b. However, because the marine zone network proposed for Alternative 2 is larger than the network proposed for Alternatives 1a and 1b, there are additional ecological impacts. Such impacts include:

Alternative 2 is likely to result in proportionally greater ecological benefits when compared to both Alternative 1 and the no action alternative;

Alternative 2 includes more protection for each biogeographic region, with particularly good representation of the highly productive Oregonian biogeographic region. Species characteristic of the Oregonian biogeographic region are likely to benefit more from protection within marine zones proposed in Alternative 2 than those proposed in Alternatives 1a and 1b.

Alternative 2 includes the following unique biophysical characteristics that are not included in the proposed essential fish habitat or Alternatives 1a and 1b:

- Medium to high relief rocky reefs in Carrington Point MR will likely protect numerous rockfish species, including bocaccio, vermilion, canary, yellowtail, and olive rockfish;
- Unconsolidated mud, sand and gravel habitats at Judith Rock MR will likely protect various species of interest including sea cucumber, spot prawn, thornyhead, sablefish, sardine, anchovy, mackerel and thresher shark;
- Additional area over the continental shelf and slope north of Anacapa Island will likely protect benthic species, such as sea cucumber, ridgeback and spot prawns and halibut, and pelagic species such as squid, sardine, anchovy, mackerel, tunas, billfish, swordfish, and various sharks; and
- Additional area south of Santa Rosa Island at South Point will likely protect benthic species, such as sea cucumber, spot prawn, halibut, thornyhead, and sablefish, and pelagic species such as squid, white seabass, sardine, anchovy, mackerel, and thresher shark.

The average width (short axis) across marine zones in Alternative 2 is 3.3 nmi with a range from 1.1 nmi at Judith Rock MR to 6.8 nmi at Richardson Rock MR. The regions on the south side of San Miguel Island and the north sides of Santa Cruz and Anacapa islands are not well represented in marine zones proposed in Alternative 2.

The addition of a marine reserve at Carrington Point (Santa Rosa Island) and the extension of the South Point MR (Santa Rosa Island) increase the likelihood that the proposed marine zones in Alternative 2 will function as an ecological network.

5.1.6 Cumulative Ecological Effects

This section discusses and analyzes the cumulative ecological impacts of the proposed action when viewed in the context of other influences on the ecosystem. As noted above, fished species are most likely to be impacted by the proposed action. Past, present, and foreseeable future impacts (both human-caused and natural) that affect fishery resources need to be considered for a full evaluation of potential ecological consequences of the proposed action. Regulatory actions that influence the amount, timing, and location of fishing in the area may complement and contribute to the Sanctuary's goals for this proposed action. The proposed rule published by NOAA to implement the most recent management plan review for the CINMS (71 FR 29096; May 19, 2006) was also considered but was determined not to have adverse or beneficial impacts on the users being impacted by this action, thus it is not a factor in this cumulative effects analysis.

In addition to the State marine zones in the CINMS, other spatial closures implemented by NMFS, CDFG and other agencies with various objectives are located within the project area. Refer to Appendix F for a list of fishery management measures in the region. Not all of the measures listed in Appendix F are relevant for a cumulative effects analysis, however, because many are applicable to the larger region and are made less relevant by the more stringent regulations that affect the Sanctuary analyzed in this section. For the purposes of this analysis, the following measures are considered:

- The Trawl Rockfish and Non-Rockfish Trawl Closures;
- The Cowcod Conservation Area;
- Amendment 19 to the Groundfish FMP;
- Proposition 132 – Gill net Restriction;
- Temporal seabird and marine mammal closures; and
- Marine Life Protection Act (MLPA).

The Trawl Rockfish and Non-Groundfish Trawl Closures were established in 2002 by the PFMC and NMFS. The purpose of these fishery closures is to protect overfished shelf rockfish species. The following eight species of West Coast groundfish were declared overfished by NMFS, and protected within the Rockfish Conservation Areas: Cowcod, canary rockfish (northern and central California), darkblotched rockfish, Pacific ocean perch, lingcod, bocaccio, widow

rockfish, and yelloweye rockfish. Recreational fishing for rockfish is also prohibited in January and February 2006. The area between 450-900 ft. depth is closed to trawling for rockfish, halibut and sea cucumber. The area between 600-900 ft. depth is closed to trawling for ridgeback shrimp. Collectively, these closures are known as the Trawl Rockfish and Non-Rockfish Trawl Closures. It is important to note that the depths of the fishery closures have changed over time. Initially, the closure extended from 120 – 900 ft depth. In 2004, the upper limit of the closed area was lowered to 360 ft. In 2005, the upper limit of the closed area was lowered again to 450 ft. The Rockfish Conservation Area is reviewed frequently by the PFMC and NMFS and the extent of the closure is likely to change again in the future. The closure may be removed entirely if and when the PFMC considers overfished rockfish species have recovered sufficiently to withstand continued fishing pressure.

The CDFG implemented a "Cowcod Conservation Area", an area closure for cowcod off southern California in 2000. Fishing for cowcod, greenlings, California scorpionfish, California sheephead, and ocean whitefish is prohibited in depths of 120-900 ft. The recovery of cowcod and associated species is estimated at approximately 90 years.

In 2006, NMFS adopted Amendment 19 to the Pacific Coast Groundfish Fishery Management Plan (FMP). Amendment 19 provides for a program to describe and protect essential fish habitat (EFH)[21] for Pacific Coast Groundfish. The regulations seek to minimize to the extent practicable adverse impacts from fishing to EFH. NMFS recommended that bottom contact gear[22] be prohibited in the existing State marine zones and the Sanctuary proposed marine zones described in Alternative 1.

The proposed action would supplement the fishery closures listed above. The designation of marine reserves in or near areas protected by fishery closures adds another layer of protection, further ensuring that no fishing will occur on targeted species in the fishery closures and the adjacent areas protected by the marine reserves. Protection of the water column and all biophysical characteristics of marine reserves likely will enhance the recovery of targeted species protected by fishery closures. The synergistic effects may result from protection by marine reserves of species and ecological processes consistent and adjacent to fishery closures.

The consistency between proposed marine zones and fishery closures ranges from 0 to 100 percent for individual proposed marine zones (Table 24). The benthic habitats within the existing State marine zones and Alternative 1 have been designated as essential fish habitat (EFH). However, the proposed EFH does not include all areas proposed in Alternative 2.

[21] Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C. 1802 (10)).

[22] Bottom Contact Gear is defined as fishing gear designed or modified to make contact with the bottom. This includes, but is not limited to, beam trawl, bottom trawl, dredge, fixed gear, set net, demersal seine, dinglebar gear, and other gear (including experimental gear) designed or modified to make contact with the bottom. Gear used to harvest bottom dwelling organisms (e.g. by hand, rakes, and knives) are also considered bottom contact gear for purposes of this subpart.

Proposed fully-protected marine reserves that do not overlap with the proposed essential fish habitat are at Carrington Point and Judith Rock; proposed marine zones that overlap partially with the proposed essential fish habitat are South Point MR, Anacapa Island MR and MCA, and Richardson Rock MR. Synergistic effects are likely to occur in areas where the proposed marine zones and fishery closures are spatially consistent.

Table 24 Estimated Percent Overlap of Existing and Proposed Marine Zones with Fishery Closures

	Fishery Closures in Existing State Marine Zones		Fishery Closures in Alternative 1		Fishery Closures in Alternative 2	
Location	**RCA [1]**	**EFH [2]**	**RCA [1]**	**EFH [2]**	**RCA [1]**	**EFH [2]**
Anacapa Island MCA	0	100	86.5	100	95.5	32.7
Anacapa Island MR	15.3	100	100	100	100	33.8
Carrington Point MR	0	100	0	0	12.5	0
Footprint MR	No existing zone	No existing zone	13.2	100	13.2	100
Gull Island MR	24.8	100	3	100	3	100
Harris Point MR	0	100	7.5	100	7.5	100
Judith Rock MR	0	100	0	0	48.9	0
Richardson Rock MR	1.8	100	15.9	100	24.8	71.8
Santa Barbara I. MR	[1]16.4	100	[1]1.2; [3]100	100	[1]1.2; [3]100	100
Scorpion MR	31.9	100	100	100	100	100
South Point MR	19	100	31.8	100	11.9	26.6
Skunk Point MR	0	100	0	0	0	0
Painted Cave MCA	0	100	0	0	0	0

[1]Rockfish Conservation Area (450-900 ft)
[2]Essential Fish Habitat Designation, proposed by PFMC and NOAA Fisheries.
[3]Cowcod Conservation Area (120-900 ft)

Proposition 132, known as the Marine Resources Protection Act, was established in 1990 and prohibits the use of gillnets in portions of State waters south of Point Arguello, California. The closure was established as a result of impacts of gill nets on nearshore fish populations, including white sea bass, and incidental capture and drowning of California sea lions and harbor seals. The prohibition encompasses one mile around the Channel Islands, including a portion of the State marine zones. The Proposed Action would be expected to enhance protection of targeted and incidental species of shallow water gill nets by prohibiting all extractive activities and protecting the entire ecosystem within the zones.

The U.S. Department of Interior's Fish and Wildlife Service and Channel Islands National Park have seasonal area closures to protect nesting birds and marine mammals.

The Proposed Action would supplement the closures by establishing temporally permanent zones that further protect species from human disturbance.

The Marine Life Protection Act (MLPA) Initiative was adopted by the California Fish and Game Commission in 2005 to improve the array of MPAs existing in California's State waters. The MLPA initiative calls for a plan to establish networks of MPAs to protect the diversity and abundance of marine life and the integrity of marine ecosystems.

The Proposed Action complements and augments the MLPA. The MLPA and the Proposed Action both outline an ecosystem-based management approach to protect marine populations, habitats, and ecological linkages in the Southern California Bight. Hence, the Proposed Action augments the MLPA.

The Marine Life Management Act (MLMA) was passed in 1999 and outlined significant changes in the philosophy and implementation of marine management. It shifted management from a single-species approach, focused on economically important species, to an ecosystem-based approach. The MLMA acknowledges the need to protect all species and their habitats to manage and conserve marine living resources. The MLMA outlines a precautionary approach to management in that it assumes regulatory action before significant impacts occur on marine species or habitats. The Proposed Action would complement the MLMA. The Proposed Action utilizes the ecosystem-based management approach mandated in the MLMA and protects and enhances the suite of habitats, populations, and ecological processes in the sanctuary.

The spot prawn trawling prohibition took effect in 2003 as a response to declines in spot prawn catch and bycatch of bocaccio. Historical spot prawn trawling within the sanctuary most commonly occurred along the northern extent of the sanctuary in deeper waters. Both alternatives are spatially consistent with portions of the historical trawling grounds, although alternative 2 has a greater proportional consistency. The Proposed Action would likely increase protection of spot prawn and bocaccio populations and habitats in the sanctuary because other extractive activities that may target those species, such as spot prawn traps, are prohibited within their bounds.

5.2 Socioeconomic Impacts

This section provides a summary of the socioeconomic impacts of the alternatives using socioeconomic information gathered through 2003. Included in this section is a brief summary of the potential costs and benefits from the alternatives. This section does not, however, provide detailed comprehensive analyses of the consumptive and non-consumptive uses of the CINMS. More detailed analyses and documentation of the approach, methods, data and comparative analyses with respect to designated marine reserves in State waters is available in CDFG (2002)

and for the whole CINMS in Leeworthy and Wiley (2005). These documents are incorporated by reference in this DEIS and can be found at http://www.dfg.ca.gov/mrd/ci_ceqa/index.html and http://www.cinms.nos.noaa.gov/marineres/mrec.html, respectively.

The socioeconomic impacts described for Alternatives 1a and 1b below are the same. In addition, despite the fact that Alternative 1c would result in unprotected gaps between the Federal and State marine zones, the socioeconomic impacts are only nominally different from those described for Alternatives 1a and 1b. As such, the socioeconomic impacts of all three subalternatives analyzed below are referred to as "Alternative 1".

5.2.1 Methodology Used in This Socioeconomic Analysis

5.2.1.1 Step 1 Analyses

The socioeconomic analyses are based on a two-step approach. Step 1 analyses describe the potential impacts of each alternative and a comparison of impacts of alternatives for commercial fisheries, and for consumptive recreational and commercial (e.g., charter) activities (Leeworthy and Wiley 2005). The analyses also provide an aggregate consumptive impact assessment. The Step 1 analyses add all the activities displaced from marine reserve and conservation areas, with the assumption that all is lost, i.e., there is no mitigation or off-sets through behavioral responses.

The Step 1 analyses describe maximum potential loss of income for consumptive activities for the additional State waters, for Federal waters, and in the total of new reserves and conservation areas. Additionally, Leeworthy and Wiley (2005) provide analyses of the existing State reserves and the cumulative impacts for each alternative.

Substitution/relocation, replenishment effects, the effects of other regulations, the current and future status of fishing stocks, and the benefits of marine reserves are not addressed in the Step 1 analyses. The Step 1 analyses therefore generally represent the expected maximum potential loss. However, in cases where congestion effects occur due to displacement and relocation of fishing effort, losses could exceed estimates of maximum potential loss.

Given the two alternatives, 14 species/species groups, two jurisdictions (State and Federal waters), 12 ports of landing and seven counties in the impact area, the Step 1 analyses include many tables with a great deal of detail in Leeworthy and Wiley (2005). Note that there is a disproportional impact by jurisdiction (State versus Federal waters) since density of recreational and commercial activity increases as one moves towards the islands. More detailed tables and documentation can be found in Leeworthy and Wiley (2005).

5.2.1.2 Step 2 Analyses

Step 2 analyses qualitatively describe factors that contribute to potential costs and, when possible, the benefits of the establishment of marine reserves within the project area (Leeworthy

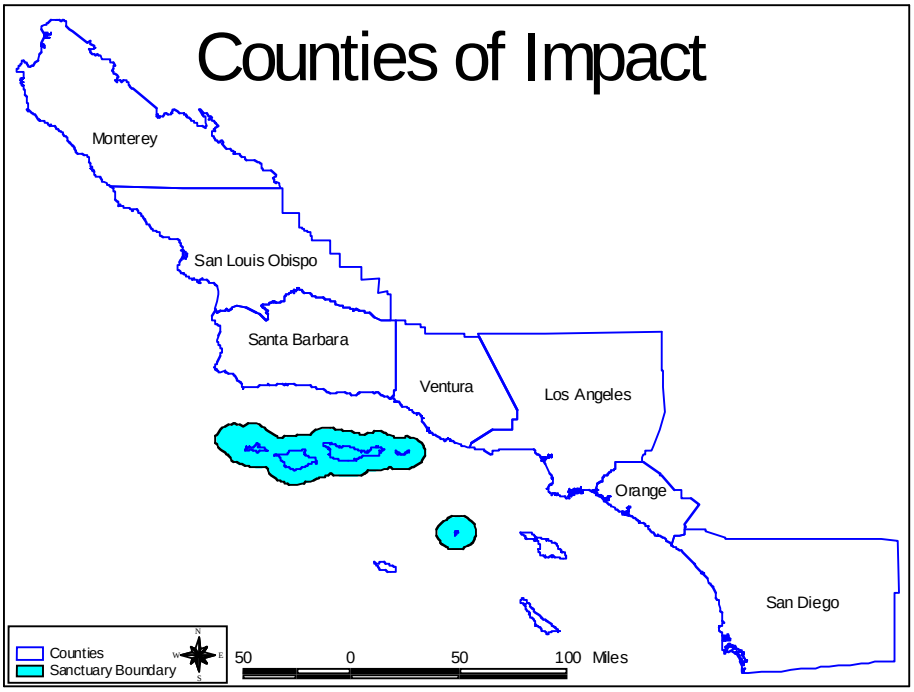
and Wiley 2005). It is impossible to forecast all of the human and ecological responses and their interactions that may result from a designation of a network of marine reserves in State and Federal waters of the CINMS. All the benefits and costs of marine reserves cannot be quantified, and so a formal benefit-cost analysis was not conducted by Leeworthy and Wiley (2005). Instead, a "benefit-cost framework" is used; all potential benefits and costs are listed and quantified where possible in Leeworthy and Wiley (2005). Those benefits and costs that cannot be quantified are qualitatively discussed in the analyses.

The Step 2 analysis is more comprehensive, but also much less quantitative since all the benefits and costs of marine reserves cannot be quantified. A complete characterization of the factors considered in the Step 2 Analysis is found in Leeworthy and Wiley (2005).

5.2.1.3 The Study Area

Overall, Leeworthy and Wiley (2005) profile the potential costs to commercial and recreational fishers and non-consumptive users for each county within the seven-county study area. Figure 13 shows a map of the seven-county area defined as the area of socioeconomic impact. All seven counties are impacted by commercial fishing activities and five counties (i.e., Santa Barbara, Ventura, Los Angeles, Orange and San Diego) are impacted by recreational activities.

Figure 13 Counties of Impact



The economic baseline estimate for the Leeworthy and Wiley (2004) study is depicted in Table 25. Table 24 depicts 1) an aggregate for the average ex vessel value of the commercial fisheries in the CINMS for years 1996-2003 for 10 species/species groups; 2) the 2003 ex vessel value for rockfish, tuna and prawn, and the 2000-2003 average for CA Sheephead; and 3) consumptive and non consumptive recreational activities including person days of activities, total income generated by the activity in the seven county economy and the number of full and part time jobs. These estimates serve as the baseline from which the impacts of marine reserves and conservation areas are assessed. In the baseline, the top 14 species/species groups accounted for 99.47 percent of the commercial landings from the CINMS. Abalone fishing was halted in 1997, so for the baseline, abalone ex vessel value is zero.

Table 24 Baseline Local/Regional Economic Dependence on CINMS

Measurement	Kelp & Commercial Fishing	Consumptive Recreation	Total Consumptive Activities	Non-consumptive Recreation	All Activities
Ex Vessel Revenue[1]	$24,233,406	N/A	N/A	N/A	N/A
Person-days[2]	N/A	448,054	448,054	42,008	490,062
Income[3]	$71,649,959	$26,416,557	$98,066,505	$3,738,223	$101,804,728
Employment[4]	1,956	1,138	3,094	223	3,317

[1.] Includes revenue to Includes revenue to fishermen plus processed value of kelp from ISP Alginates.
[2] Measure of recreation activity. One person doing an activity for any part of a day or a whole day.
[3] Total income generated by activity in seven-county local/regional economy, including multiplier impacts.
[4] Number of full and part time jobs generated in seven-county local/regional economy, including multiplier impacts.

5.2.2 Impacts To Commercial Fishing

There is very little difference between Alternatives 1 and 2. The new proposed areas of Alternative 1 potentially impact 1.18% of ex vessel value of catch in the CINMS, while Alternative 2 potentially impacts 1.63% of ex vessel value in the CINMS. Estimated potential impacts, measured in terms of income and employment in the local county economies, also show slightly higher impacts for Alternative 2 (Table 25).

Table 25 Commercial Fishing & Kelp - Summary of Impacts by Alternative (Step 1 Analysis)

Alternative	Additional State	1%	Federal	%	Total New Proposal	%	Existing State	%	Cumulative Total	%
Ex Vessel Revenue [2]										
1	$159,955	0.66	$123,725	0.51	$283,680	1.18	$2,729,295	11.32	$3,012,975	12.5
2	$195,851	0.81	$196,732	0.82	$392,584	1.63	$2,729,295	11.32	$3,121,879	12.95
Income[3]										
1	$499,787	0.7	$439,661	0.61	$939,448	1.31	$8,544,396	11.93	$9,483,844	13.24
2	$658,443	0.92	$649,618	0.91	$1,308,061	1.83	$8,544,396	11.93	$9,852,457	13.75
Employment [4]										
1	15	0.77	13	0.66	28	1.43	246	12.58	274	14.01
2	20	1.02	19	0.97	39	1.99	246	12.58	285	14.57

1. Percents are the percent of total baseline.
2. Ex vessel revenue received by fishermen and processed value of kelp, Baseline is equal to $24,103,965.
3. Income is total income, including multiplier impacts. Baseline is equal to $71,649,948.
4. Employment is total employment, including multiplier impacts. Baseline is 1,956 full and part-time jobs.

5.2.2.1 Alternative 1 – Step 1 Analysis (Commercial Fishing)

This regulatory alternative potentially impacts about $283,700 in ex vessel value of catch or 1.18% of the annual ex vessel value of catch from the CINMS. There are zero additional impacts to kelp harvesters/processors under this alternative. In terms of absolute annual dollar amounts or ex vessel revenue, the largest potential impacts are on harvesters of squid, wetfish, urchins, prawn and rockfish; and the smallest impacts are on harvesters of CA Sheephead, tuna, sea cucumbers, and sharks (Table 26). As shown in Table 27, this regulatory alternative affects less than one percent of the ex vessel value of all catch landed at each port, except Port Hueneme (1.15%) and Channel Islands (1.04%).

The potential losses in annual ex vessel revenue translate into a maximum potential loss of about $939,000 in annual income and 28 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0002% for income and 0.0003% for employment; see Table 28 and Table 29).

Impact by Jurisdiction

There is a disproportional impact by jurisdiction (Additional State versus Federal waters) since, for most species/species groups, density of commercial fishing activity increases as one moves towards the islands. Additional State waters accounted for 20.39% of the Alternative 1 MPA area, while the remaining 79.61% is in Federal waters. However, 56.39% of the maximum potential loss for new MPAs in Alternative 1 occurs in State waters, compared with 43.61 % in Federal waters.

Although Alternative 1 only potentially impacts 1.18% of the annual ex vessel value of catch and harvest of kelp in the CINMS, the existing State MPAs potentially impact 11.32% of the annual ex vessel value of catch and harvest of kelp. Cumulatively, about $3 million in ex vessel value of catch and harvest of kelp or 12.5% of the total ex vessel value of catch and harvest of kelp in the CINMS is potentially lost. In terms of absolute amount of annual dollars lost, the largest impacts are to harvesters of squid, urchins, spiny lobsters and wetfish, while the smallest losses are to harvesters of tuna, shark and sculpin and bass. In terms of percentage of total ex vessel value of catch or harvest of kelp, the greatest potential impacts are on rockfish (23.93%), prawn (20.44%), and wetfish (19.04%), while the smallest impact was on kelp (5.48%). According to ISP Alginates, the impacts on kelp harvesting from existing State reserves have not occurred, and since ISP Alginates is closing operations, there will be no future impact. If kelp is removed from the analysis, the potential impact is reduced by $328,588 to $2,400,727 for the existing State reserves and a total cumulative impact of $2,684,406 or 14.8% of the total commercial fishing harvest in the CINMS ($2,684,406 / $18,112,598) without kelp.

The impact on ports and harbors is estimated to be concentrated in the ports in Santa Barbara, Ventura Harbor, Channel Islands, San Pedro and Terminal Island. In terms of percent of all ex vessel value of catch landed at the ports, the ports of Santa Barbara would be impacted the most (9.91%) followed by Port Hueneme (9.65%), Ventura Harbor (8.37%) and Channel Islands (7.85%). Only an estimated 1.04% of San Pedro's ex vessel value of landings would be potentially impacted and only 0.77% of Terminal Island's ex vessel value of landings would be potentially impacted (Table 27).

The potential losses in annual ex vessel revenue translate into a maximum potential loss of about $9.5 million in annual income and 274 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0016% for income and 0.0027% for employment; see Table 28 and Table 29).

Among counties, Ventura County would be the county with the largest potential impact. Ventura County would potentially lose about $5.1 million in annual income and about 156 full and part-time jobs. Again, these amounts are tiny fractions of one percent of the Ventura County economy (0.0189% of income and 0.037% of employment).

Table 26 Commercial Fishing – Alternative 1 Study Area Totals, Ex Vessel Value by Species Groups

Species/ Species Group	Add'l State Value	%	Federal Value	%	Total: New Value	%	Existing St. Value	%	Total: Cumulative Value	%
Squid	70,603	0.65	42,362	0.39	112,965	1.05	1,355,606	12.57	1,468,572	13.61
Kelp	0	0.00	0	0.00	0	0.00	328,568	5.48	328,568	5.48
Urchins	38,247	0.89	0	0.00	38,247	0.89	656,403	15.19	694,650	16.08
Spiny Lobster	8,474	0.83	0	0.00	8,474	0.83	167,242	16.32	175,716	17.15
Prawn	19,694	9.33	16,995	8.06	36,689	17.39	6,431	3.05	43,120	20.44
Rockfish	7,250	4.74	9,054	5.92	16,304	10.66	20,278	13.26	36,582	23.93
Crab	1,767	0.43	0	0.00	1,767	0.43	58,924	14.21	60,692	14.63
Tuna	39	1.27	304	9.86	343	11.13	50	1.62	393	12.75
Wetfish	9,603	2.02	45,114	9.51	54,717	11.54	35,564	7.50	90,281	19.04
CA Sheephead	195	0.13	0	0.00	195	0.13	26,645	17.16	26,840	17.28
Flatfishes	1,157	0.53	3,826	1.75	4,983	2.28	23,760	10.88	28,743	13.17
Sea Cucumbers	690	0.31	0	0.00	690	0.31	37,030	16.68	37,720	16.99
Sculpin & Bass	1,891	2.03	5,300	5.69	7,191	7.72	8,360	8.97	15,551	16.69
Shark	345	1.00	770	2.24	1,115	3.24	4,431	12.88	5,546	16.12
Total	159,955	0.66	123,725	0.51	283,680	1.18	2,729,295	11.32	3,012,974	12.50

Table 27 Commercial Fishing - Alternative 1 Study Area Totals, Ex Vessel Value by Port

Port	Additional St Value	%[1]	Federal Value	%[1]	Total: New Value	%[1]	Existing St Value	%[1]	Total: Cumulative Value	%[1]
1. Moss Landing	$10	0.00	$20	0.00	$30	0.00	$98	0.00	$128	0.00
2. Morro Bay	$1,801	0.09	$1,557	0.07	$3,358	0.16	$1,460	0.07	$4,817	0.23
3. Avila/Port San Luis	$103	0.01	$91	0.01	$195	0.02	$1,561	0.12	$1,756	0.14
4. Santa Barbara	$42,955	0.58	$10,111	0.14	$53,066	0.71	$684,042	9.20	$737,108	9.91
5. Ventura Harbor	$24,255	0.50	$17,848	0.37	$42,104	0.87	$364,564	7.50	$406,668	8.37
6. Channel Islands	$26,072	0.65	$15,597	0.39	$41,669	1.04	$271,390	6.81	$313,059	7.85
7. Port Hueneme	$52,329	0.51	$65,951	0.64	$118,280	1.15	$873,265	8.50	$991,545	9.65
8. San Pedro	$6,232	0.05	$6,098	0.05	$12,330	0.11	$106,625	0.93	$118,955	1.04
9. Terminal Island	$5,307	0.04	$5,655	0.04	$10,962	0.08	$91,824	0.68	$102,786	0.77
10. Avalon & Other LA	$317	0.02	$333	0.02	$650	0.05	$1,845	0.14	$2,495	0.19
11. Newport Beach	$448	0.05	$386	0.04	$834	0.09	$374	0.04	$1,208	0.13
12. San Diego	$87	0.00	$79	0.00	$166	0.01	$2,677	0.11	$2,842	0.11

1. Percents are the amount of ex vessel value as a percent of the total ex vessel value of landings at the Port (1996-2003 Average Annual Value), for all species groups, except Prawn, Rockfish and Tuna, which were valued using 2003 value of landings and CA Sheephead that was valued using the 2000-2003 average value of landings.

Table 28 Commercial Fishing - Alternative 1 Study Area Totals, Total Income by County

County		Additional St	Federal	Total: New	Existing St	Total: Cumulative
Monterey		$44,045	$26,433	$70,477	$845,526	$916,003
	%	0.0003	0.0002	0.0005	0.0065	0.0070
San Luis Obispo		$4,305	$3,675	$7,981	$6,412	$14,393
	%	0.0001	0.0000	0.0001	0.0001	0.0002
Santa Barbara		$82,763	$12,207	$94,970	$1,387,502	$1,482,473
	%	0.0006	0.0001	0.0007	0.0101	0.0108
Ventura		$296,062	$336,617	$632,678	$4,483,234	$5,115,913
	%	0.0011	0.0012	0.0023	0.0166	0.0189
Los Angeles		$71,559	$59,808	$131,366	$1,298,161	$1,429,528
	%	0.0000	0.0000	0.0000	0.0004	0.0005
Orange		$900	$783	$1,683	$811	$2,494
	%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego		$153	$139	$292	$522,749	$523,041
	%	0.0000	0.0000	0.0000	0.0005	0.0005
All 7 Counties		$499,787	$439,661	$939,448	$8,544,396	$9,483,844
	%	0.0001	0.0001	0.0002	0.0015	0.0016

Table 29 Commercial Fishing Impacts of Alternative 1 on Total Employment By County

County		Additional St	Federal	Total: New	Existing St	Total: Cumulative
Monterey		1	1	2	25	27
	%	0.0006	0.0003	0.0009	0.0106	0.0115
San Luis Obispo		0	0	0	0	1
	%	0.0001	0.0001	0.0002	0.0002	0.0004
Santa Barbara		3	0	3	45	48
	%	0.0011	0.0002	0.0012	0.0177	0.0189
Ventura		9	10	19	136	156
	%	0.0021	0.0024	0.0046	0.0324	0.0370
Los Angeles		2	2	3	34	38
	%	0.0000	0.0000	0.0001	0.0006	0.0007
Orange		0	0	0	0	0
	%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego		0	0	0	5	5
	%	0.0000	0.0000	0.0000	0.0003	0.0003
All Counties		15	13	28	246	274
	%	0.0001	0.0001	0.0003	0.0024	0.0027

5.2.2.2 Alternative 1 – Step 2 Analysis (Commercial Fishing)

In Step 1 analysis, this regulatory alternative impacted an additional 1.18% of the ex vessel value of catch in the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to below one percent (0.95%) of the total ex value of commercial catch in the CINMS. Squid is also a coastal pelagic species. It is a possibility that squid could simply be caught when they move out of the protected areas and thus there would be no loss. If squid could be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to less than one half of one percent (0.48%) of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 0.7% of the total value of catch from the CINMS. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) model suggest that there would be some losses to the commercial fisheries in the short-term, but less than the maximum potential losses estimated in Step 1. This conclusion might be muted to some extent for rockfish due to the Rockfish Conservation Areas and the Groundfish depth contour closures. These areas cover a large proportion of area both inside and outside the CINMS. This limits the possibility of commercial fishermen offsetting any losses from the marine reserves from remaining open areas, since there are few remaining open areas. However, this fishery is in steep decline in the CINMS and throughout the State of California and without serious action this fishery is likely to continue to decline.

Prawn make up about 13% of the estimated impact of this alternative on the commercial fisheries in Step 1 analysis. Prawn catch both in the CINMS and the State of California has been in decline since 2000. This fishery was in steep decline prior to the spot prawn trawling prohibition that took effect in 2003. Trap fishing is replacing trawling and so it is not clear if prawn catch will increase as fishermen adjust to the new regulations. If they do and catch increases, the short-term impacts could be greater than what was estimated in Step 1 for this fishery.

On net, it can be expected that there will be short-term losses to the commercial fisheries from this alternative, but that they will be less than what was estimated in Step 1 analyses.

In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. As noted above, squid and wetfish, which are coastal pelagic species, account for a majority of the impact on the commercial fisheries from the added MPAs. It is not clear to what extent the added areas serve as sinks or sources for these species. In general, the results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, it is not clear that these general results will apply for this alternative. Overall the impacts are small from this alternative and net cost or benefits to commercial fisheries are likely to be neglible.

Cumulative Impacts

In Step 1 analysis, the impact of this regulatory alternative was estimated to potentially impact 12.5% of the total ex vessel value of catch from the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to 12.1% of the total ex value of commercial catch in the CINMS. If squid could also be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to 6% of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 9.1% of the total value of catch from the CINMS. In the short-term, less impact than estimated in Step 1 can be expected. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) models suggest there will be short-term costs to the commercial fisheries, but less than the maximum potential costs.

In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. The results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, if commercial fishermen do not accept these results, there could be increased social costs in terms of additional administrative activities and lawsuits, and increased costs of enforcement due to low compliance with the regulations. Both ecological and socioeconomic monitoring and education and outreach efforts may be required to mitigate or avoid these social costs.

Other regulations can work towards mitigating, offsetting, avoiding costs, or increasing the costs. Some regulations are known to have short-term costs with long-term benefits to the fishermen. But because many fisheries are open access, fishermen that suffer the short-term costs (make an investment) are not guaranteed that they will receive the benefits (the return on investment).

Several issues are summarized in Table 30 to address potential cumulative impacts which shows that a time dimension is separated by the category of short-term (1 to 5 years) and long-term (5 to 20 years) impacts (Leeworthy and Wiley 2005). For the short-term, the net assessment for commercial fishing and kelp ranges between neutral impacts to an increase in costs beyond Step 1. The most important factors influencing this assessment are the current status of stocks (neutral except for rockfish and spot prawn), regulated inefficiency (which may decrease costs) and the SAP's recommendation that catch and/or effort be held constant in the remaining open areas is not implemented (increases cost). The SAP recommended the effort displaced by marine reserves should exit the fisheries, i.e., the assumption of the Step 1 analysis. If warranted, there is uncertainty about whether such catch and effort recommendations will be included in current and future fishery management plans. If not, the problem of crowding and congestion may result in increased costs (beyond Step 1 costs) in the short-term. In addition, the social costs of not accepting regulations, which might result in increased enforcement costs, may increase costs beyond those estimated in Step 1.

For the long-term, assuming replenishment effects (benefits), substitution/relocation (decrease costs), cowcod closure (benefits) and regulated inefficiency (may decrease costs) leads to a conclusion that impacts in Step 1 were likely overestimated and that there are reasonable possibilities of net benefits.

The proposed rule published by NOAA to implement the most recent management plan review for the CINMS (71 FR 29096; May 19, 2006) was also considered but was determined not to have adverse or beneficial impacts on the users being impacted by this action, thus it is not a factor in this cumulative effects analysis.

Table 30 Commercial Fishing and Kelp - Impacts Relative to Step 1 Analysis

Factors	Short-term	Long-term
1. Status of Fishing Stocks	O to l (rockfish)	O to l (rockfish)
2. Replenishment Effects	o	n
3. Substitution/Relcoation	o	o
4. Crowding/Congestion Effects	l	l
5. Quality Increases in Marine Reserves	O	O
6. Other Regulations		
a) Regulated Inefficiency	o	o
b) Proposition 132 (Gillnet Restriction)	O	O
c) Allocations to Other User Groups	l	l
d) Cowcod Closure	l	n
e) Opening up some Cowcod Closure Areas	o	o
f) MLPA - Closed Areas	O	O
g) MLMA Fishery Management Plans	O	O
h) ITQs currently not being considered	O to o	O to o
I) Existing Area Closures	O	O
j) Temporal Closures	l	l
k) Economic Conditions and Outside and Internal Forces	l	l
l) Rockfish Conservation Areas	O to o	o to l
m) Groundfish Closures	O to o	o to l
n) Spot Prawn Trawling Prohibition	O to o	o to l
7. Pelagic Species	o	o
8. Phasing	o	o
All Factors	O to l	o to n

O = Neutral Impact
l = Increase in costs from Step 1
o = Decrease in costs from Step 1
n = No costs from Step 1 - instead, benefits

Many fishery regulations are what economists describe as regulated inefficiency. Sometimes inefficiencies are imposed to more equitably spread out the benefits of a fishery by forcing all involved to adopt more economically inefficient methods of harvest. But in the commercial

fisheries, fish is mostly a food product that competes with many food products. Over the long run, pressure builds and market forces work to the detriment of those that produce inefficiently. These are forces beyond the control of fishermen or fishery managers. Regulations that make the fisheries inefficient will lead towards a status quo (without marine reserves) downward path in the regulated activity. This would mean that the baseline estimates in Step 1 are overestimates of potential costs. The weekend closure of the squid fishery is a good example of regulated inefficiency. For a complete listing of existing fishery regulations please see Appendix F.

Regulations may be designed to benefit one group at the expense of another group. Allocation between user groups of total allowable catch is an example. California Proposition 132 restricted the use of gill nets within one mile from shore. This has reduced catch to gill net fishermen and some are claiming that this has been a benefit to recreational fishermen (Kronman, 2001).

Some measures are taken only when the fisheries have collapsed or are at near collapse. The cowcod closures and the Nearshore Fishery Management Plan for rockfish are good examples. The efforts here are on rebuilding stocks. The cowcod closure falls into that category of a regulation that requires investment to get a future return. But with many rockfish (because of their noted slow growth rates and longer life cycles) this may require a long-term investment to get an even longer-term return on investment. Given the open access nature of the fishery, it is predicted that fishermen would heavily discount future benefits, since they don't expect to see the returns. They would not want to make further investments in more closed areas. The impacts that are estimated in Step 1 are in addition to the impacts already felt from the cowcod closure. There is no additional impact beyond what was estimated. The cowcod closure is not seen as a factor making the impact of the marine reserves greater than what was estimated in Step 1. If the cowcod closure works, it should be a long-term mitigating and offsetting factor making the estimates of impact overestimates in the long-term. Opening up the cowcod closure areas in the future will offset the losses to those pursuing species restricted by the cowcod closure. So even in the short-term the Step 1 analyses will overState the costs when the cowcod closure, Nearshore Fishery Management Plan and Market Squid Fishery Management Plan are considered.

The Marine Life Protection Act (MLPA) is a California law directing the establishment of a network of marine protected areas (including no take areas) throughout the State. The existing State MPAs in the CINMS went into effect on April 9, 2003. In establishing additional zones outside the CINMS, it will be important to recognize the impact that these areas will have on consumptive users. In the Step 1 analysis, the additional impacts, from extending the existing State MPAs in the CINMS to additional State waters and Federal waters (this regulatory action), was evaluated and then the cumulative impact was evaluated.

The Marine Life Management Act (MLMA) is a California law directing the establishment of fishery management plans (FMP), such as the Nearshore FMP and the Market Squid FMP. The Market Squid FMP calls for a limited entry program and a reduction in current capacity, thus the

projected losses in the Step 1 analysis are likely overestimated. Until other fisheries management plans are finalized, cumulative impacts can not be assessed.

One example of rational fishery management is the use of individual transferable quotas (ITQs). There have been limited discussions of the use of ITQs in developing fishery management plans. ITQs are preferred by a large majority of economists because they can be designed to take advantage of market efficiencies. ITQs address the fundamental problems of open access, common property resources. They allow users to benefit from investments in the fisheries. Issues of equity and efficiency can be addressed in initial assignments of quotas. ITQs likely would result in much greater initial reductions in capacity, income and employment in the commercial fisheries. But over the long-term this approach would most likely yield sustainable commercial fisheries that would have the best chance of competing with other food products. This kind of rationalization of the fisheries would lead to very high offsets in losses estimated in the baseline Step 1 analysis. However, to date there appears to be no serious efforts in this direction.

How ITQs would affect the recreational fishing community is unknown without addressing the details of one of the key first steps, allocation of a given allowable catch between the commercial and recreational fisheries. The usual approach is historical proportions. There is usually a dearth of data and analysis to support an economic approach i.e., one that maximizes the value of the use of the resources. If ITQs were implemented in the commercial fisheries, the estimates of impact from marine reserves would be overestimates since implementation of the ITQs would result in much lower capacity in the fisheries.

Existing area and temporal closures also need to be addressed. The U.S. Department of Interior's Fish and Wildlife Service and Channel Islands National Park have seasonal area closures to protect nesting birds. These regulations may have some additional impacts from what was estimated. Those regulations that were already in effect in areas that will now be marine reserves will mean no additional impact than was already estimated in Step 1, i.e., they were already accounted for in the Step 1 analysis. For those areas outside the marine reserves, the impacts would be in addition just as in other area closures discussed above.

5.2.2.3 Alternative 2 - Step 1 Analysis (Commercial Fishing)

This regulatory alternative potentially impacts about $392,600 in ex vessel value of catch or 1.63% of the annual ex vessel value of catch from the CINMS. There are zero additional impacts to kelp harvesters/processors under this alternative. In terms of absolute annual dollar amounts or ex vessel revenue, the largest potential impacts are on harvesters of squid, prawn, wetfish and urchins; and the smallest impacts are on harvesters of CA Sheephead, tuna, sea cucumbers, and sharks (Table 31). This regulatory alternative affects less than one percent of the ex vessel value of all catch landed at each port, except Port Hueneme (1.56%), Channel Islands (1.61%), and Ventura Harbor (1.43%) (Table 32).

The potential losses in annual ex vessel revenue translate into a maximum potential loss of about $1.3 million in annual income and 39 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0002% for income and 0.0004% for employment; see Table 33 and Table 34).

Impact by Jurisdiction

Even though there is an almost equivalent amount of ex vessel revenue potentially lost from both the additional State waters and Federal waters, there is a disproportional impact by jurisdiction (additional State versus Federal waters) since, for most species/species groups, density of commercial fishing activity increases as one moves towards the islands. Additional State waters accounted for 17.58% of the Alternative 2 MPA area, while the remaining 82.42% is in Federal waters. However, 49.89% of the maximum potential loss for new MPAs in Alternative 2 occurs in State waters, compared with 50.11 % in Federal waters.

Although Alternative 2 only potentially impacts 1.63% of the annual ex vessel value of catch and harvest of kelp in the CINMS, the existing State MPAs potentially impact 11.32% of the annual ex vessel value of catch and harvest of kelp. Cumulatively, about $3.1 million in ex vessel value of catch and harvest of kelp or 12.95% of the total ex vessel value of catch and harvest of kelp in the CINMS is potentially lost. In terms of absolute amount of annual dollars lost, the largest impacts are to harvesters of squid, urchins, kelp, spiny lobsters and wetfish, while the smallest losses are to harvesters of tuna, shark and sculpin and bass. In terms of percentage of total ex vessel value of catch or harvest of kelp, the greatest potential impacts are on prawn (37.13%), rockfish (23.93%), sculpin & sea bass (21.03%), and wetfish (19.53%), while the smallest impact was on kelp (5.48%). Again, according to ISP Alginates, the impacts on kelp harvesting from existing State reserves have not occurred, and since ISP Alginates is closing operations, there will be no future impact. If kelp is removed from the analysis, the potential impact is reduced by $328,588 to $2,400,727 for the existing State reserves and a total cumulative impact of $2,793,310 or 15.42% of the total commercial fishing harvest in the CINMS ($2,793,310 / $18,112,598) without kelp.

The impact on ports and harbors is estimated to be concentrated in the ports in Santa Barbara, Ventura Harbor, Channel Islands, San Pedro and Terminal Island. In terms of percent of all ex vessel value of catch landed at the ports, Port Hueneme would be impacted the most (10.05%) followed by the ports of Santa Barbara (9.97%), Ventura Harbor (8.93%) and Channel Islands (8.41%). Only an estimated 1.08% of San Pedro's ex vessel value of landings would be potentially impacted and only 0.80% of Terminal Island's ex vessel value of landings would be potentially impacted (Table 32).

The potential losses in annual ex vessel revenue translate into a maximum potential loss of about $9.85 million in annual income and 285 full and part-time jobs in the seven-county regional economy. These amounts are tiny fractions of the seven-county regional economy (0.0017% for income and 0.0028% for employment; see Table 33 and Table 34).

Among counties, Ventura County would be the county with the largest potential impact. Ventura County would potentially lose about $5.37 million in annual income and about 163 full and part-time jobs. Again, these amounts are tiny fractions of one percent of the Ventura County economy (0.0199% of income and 0.0388% of employment).

Table 31 Commercial Fishing - Alternative 2 Study Area Totals, Ex Vessel Value by Species Groups

Species/ Species Group	Additional State		Federal		Total: New		Existing State		Total: Cumulative	
	Value	%	Value	%	Value	%	Value	%	Value	%
Squid	105,904	0.98	70,602	0.65	176,506	1.64	1,355,606	12.57	1,532,113	14.20
Kelp	0	0.00	0	0.00	0	0.00	328,568	5.48	328,568	5.48
Urchins	29,511	0.68	2,205	0.05	31,716	0.73	656,403	15.19	688,119	15.93
Spiny Lobster	7,840	0.77	0	0.00	7,840	0.77	167,242	16.32	175,082	17.09
Prawn	19,694	9.33	52,202	24.74	71,896	34.08	6,431	3.05	78,327	37.13
Rockfish	6,651	4.35	9,652	6.31	16,304	10.66	20,278	13.26	36,582	23.93
Crab	5,740	1.38	0	0.00	5,740	1.38	58,924	14.21	64,665	15.59
Tuna	44	1.41	355	11.51	399	12.92	50	1.62	449	14.54
Wetfish	11,180	2.36	45,901	9.68	57,081	12.04	35,564	7.50	92,645	19.53
CA Sheephead	195	0.13	0	0.00	195	0.13	26,645	17.16	26,840	17.28
Flatfishes	4,260	1.95	6,140	2.81	10,400	4.76	23,760	10.88	34,160	15.65
Sea Cucumbers	1,614	0.73	0	0.00	1,614	0.73	37,030	16.68	38,644	17.41
Sculpin & Bass	2,797	3.00	8,441	9.06	11,237	12.06	8,360	8.97	19,598	21.03
Shark	421	1.22	1,235	3.59	1,656	4.81	4,431	12.88	6,087	17.70
Total	**195,851**	**0.81**	**196,732**	**0.82**	**392,584**	**1.63**	**2,729,295**	**11.32**	**3,121,878**	**12.95**

Table 32 Commercial Fishing - Alternative 2 Study Area Totals, Ex Vessel Value by Port

	Additional State		Federal		Total: New		Existing State		Total: Cumulative	
Port	**Value**	**%[1]**	**Value**	**%[1]**	**Value**	**%[1]**	**Value**	**%[1]**	**Value**	**%[1]**
Moss Landing	$20	0.00	$29	0.00	$49	0.00	$98	0.00	$146	0.00
Morro Bay	$1,803	0.09	$4,638	0.22	$6,441	0.31	$1,460	0.07	$7,901	0.38
Avila/Port San Luis	$91	0.01	$99	0.01	$189	0.02	$1,561	0.12	$1,750	0.14
Santa Barbara	$40,272	0.54	$17,308	0.23	$57,580	0.77	$684,042	9.20	$741,623	9.97
Ventura Harbor	$34,341	0.71	$34,976	0.72	$69,317	1.43	$364,564	7.50	$433,882	8.93
Channel Islands	$26,674	0.67	$37,475	0.94	$64,149	1.61	$271,390	6.81	$335,540	8.41
Port Hueneme	$75,613	0.74	$84,239	0.82	$159,852	1.56	$873,265	8.50	$1,033,117	10.05
San Pedro	$8,750	0.08	$8,719	0.08	$17,469	0.15	$106,625	0.93	$124,094	1.08
Terminal Island	$7,403	0.06	$7,594	0.06	$14,997	0.11	$91,824	0.68	$106,822	0.80
Avalon & Other LA	$305	0.02	$414	0.03	$719	0.05	$1,845	0.14	$2,564	0.19
Newport Beach	$445	0.05	$1,156	0.12	$1,601	0.17	$374	0.04	$1,975	0.21
San Diego	$81	0.00	$91	0.00	$172	0.01	$2,677	0.11	$2,848	0.11

Table 33 Commercial Fishing - Alternative 2 Study Area Totals, Total Income By County

County	**Additional State**	**Federal**	**Total: New**	**Existing State**	**Total: Cumulative**
Monterey	$66,061	$44,047	$110,108	$845,526	$955,634
%	0.0005	0.0003	0.0008	0.0065	0.0073
San Luis Obispo	$4,283	$10,769	$15,053	$6,412	$21,465
%	0.0001	0.0001	0.0002	0.0001	0.0003
Santa Barbara	$79,751	$24,932	$104,683	$1,387,502	$1,492,185
%	0.0006	0.0002	0.0008	0.0101	0.0109
Ventura	$403,168	$479,773	$882,940	$4,483,234	$5,366,175
%	0.0015	0.0018	0.0033	0.0166	0.0199
Los Angeles	$104,142	$87,609	$191,751	$1,298,161	$1,489,912
%	0.0000	0.0000	0.0001	0.0004	0.0005
Orange	$893	$2,325	$3,219	$811	$4,030
%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego	$144	$164	$307	$522,749	$523,056
%	0.0000	0.0000	0.0000	0.0005	0.0005
All 7 Counties	**$658,443**	**$649,618**	**$1,308,061**	**$8,544,396**	**$9,852,457**
%	**0.0001**	**0.0001**	**0.0002**	**0.0015**	**0.0017**

Table 34 Commercial Fishing Impacts of Alternative 2 on Total Employment by County

County	Additional State	Federal	Total: New	Existing State	Total: Cumulative
Monterey	2	1	3	25	28
%	0.0008	0.0006	0.0014	0.0106	0.0120
San Luis Obispo	0	0	1	0	1
%	0.0001	0.0003	0.0004	0.0002	0.0005
Santa Barbara	3	1	3	45	48
%	0.0010	0.0003	0.0013	0.0177	0.0190
Ventura	12	15	27	136	163
%	0.0029	0.0035	0.0064	0.0324	0.0388
Los Angeles	3	2	5	34	39
%	0.0000	0.0000	0.0001	0.0006	0.0007
Orange	0	0	0	0	0
%	0.0000	0.0000	0.0000	0.0000	0.0000
San Diego	0	0	0	5	5
%	0.0000	0.0000	0.0000	0.0003	0.0003
All 7 Counties	**20**	**19**	**39**	**246**	**285**
%	**0.0002**	**0.0002**	**0.0004**	**0.0024**	**0.0028**

5.2.2.4 Alternative 2 – Step 2 Analysis (Commercial Fishing)

In Step 1 analysis, this regulatory alternative impacted an additional 1.63% of the ex vessel value of catch in the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to 1.39% of the total ex value of commercial catch in the CINMS. If squid could be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to less than one percent (0.66%) of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 1.0% of the total value of catch from the CINMS. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) model suggest that there would be some losses to the commercial fisheries in the short-term, but less than the maximum potential losses estimated in Step 1. This conclusion might be muted to some extent for rockfish due to the Rockfish Conservation Areas and the Groundfish depth contour closures. These areas cover a large proportion of area both inside and outside the CINMS. This limits the possibility of commercial fishermen offsetting any losses from the marine reserves from remaining open areas, since there are few remaining open areas. However, this fishery is in steep decline in the CINMS and throughout the State of California and without serious action this fishery is likely to completely disappear.

Prawn make up about 18.3% of the estimated impact of this alternative on the commercial fisheries in Step 1 analysis. Prawn catch both in the CINMS and the State of California has been in decline since 2000. This fishery was in steep decline prior to the spot prawn trawling prohibition that took effect in 2003. Trap fishing is replacing trawling and so it is not clear if prawn catch will increase as fishermen adjust to the new regulations. If they do and catch increases, the short-term impacts could be greater than estimated in Step 1 for this fishery.

On net, short-term losses to the commercial fisheries from this alternative can be expected, but that they will be less than estimated in Step 1 analyses.

In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. As noted above, squid and wetfish, which are coastal pelagic species, account for a majority of the impact on the commercial fisheries from the added MPAs. It is not clear to what extent the added areas serve as sinks or sources for these species. In general, the results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, it is not clear that these general results will apply for this alternative. But overall the impacts are small from this alternative and net cost or benefits to commercial fisheries are likely to be small.

Cumulative Impacts

In Step 1 analysis, the impact of this regulatory alternative was estimated to potentially impact 12.95% of the total ex vessel value of catch from the CINMS. If wetfish can be caught when they move outside the additional protected areas, the Step 1 impacts would be reduced to 12.6% of the total ex value of commercial catch in the CINMS. If squid could also be caught when they move out of the closed areas without loss of catch, this would further reduce the Step 1 losses from this alternative to 6.2% of the total ex vessel value of catch from the CINMS. If it is assumed that 50% of squid could be caught when they move outside the closed areas, the impact of Step 1 would be reduced to about 9.4% of the total value of catch from the CINMS. In the short-term, less impact than estimated in Step 1 is expected. The Sanchirico and Wilen (2001) model and the Sanchirico (2005) models suggest there will be short-term costs to the commercial fisheries, but less than the maximum potential costs.

In the long-term, whether replenishment effects are greater than crowding or congestion effects will determine if this alternative's long-term cost can be transformed into long-term benefits. The results of Sanchirico (2005) suggest that marine reserves, under the current fishery management regime, would likely have net benefits to the commercial fisheries. However, if commercial fishermen do not accept these results, there could be increased social costs in terms of additional administrative activities and lawsuits, and increased costs of enforcement due to low compliance with the regulations. Both ecological and socioeconomic monitoring and education and outreach efforts may be required to mitigate or avoid these social costs.

For discussion of the effects of other regulations that can work towards mitigating, offsetting, avoiding costs, or increasing the costs, refer to section 5.2.2.2.

5.2.3 Impacts To The Recreation Industry

There is more of difference between Alternatives 1 and 2 for consumptive recreational activities than for commercial fisheries. Alternative 2 potentially impacts an additional 1.4% of all consumptive recreation activity in the CINMS than Alternative 1 (Table 35).

Table 35 Summary of Consumptive Recreation Impacts by Alternative (Step 1 Analysis)

Alternative	Additional State	1%	Federal	%	Total New Proposal	%	Existing State	%	Cumulative Total	%
Person-Days [2]										
1	7,361	1.6	15,005	3.3	22,365	5	61,651	13.8	84,016	18.8
2	7,562	1.7	21,075	4.7	28,637	6.4	61,651	13.8	90,288	20.2
Income[3]										
1	$452,604	1.7	$935,292	3.5	$1,387,895	5.3	$3,275,128	12.4	$4,663,023	17.7
2	$465,200	1.8	$1,318,509	5	$1,783,709	6.8	$3,275,128	12.4	$5,058,837	19.2
Employment[4]										
1	20	1.8	42	3.7	62	5.4	138	12.1	200	17.6
2	21	1.8	59	5.2	79	6.9	138	12.1	217	19.1

1. Percents are the percent of total baseline.
2. Person-days of consumptive recreation activity is equal to 448,054.
3. Income is total income, including multiplier impacts. Baseline is equal to $26,416,557.
4. Employment is total employment, including multiplier impacts. Baseline is 1,138 full and part-time jobs.

5.2.3.1 Alternative 1 - Step 1 Analysis (Recreational Consumptive Activities)

This regulatory alternative displaces about five percent (5.0%) of the annual person-days of consumptive recreation in the CINMS. The estimated maximum potential loss associated with this displacement is about $1.4 million in annual income and about 61 full and part-time jobs in the local county economies. Annual consumer's surplus loss to displaced consumptive recreators is estimated to be about $793,000. Charter/party boat operations could potentially lose about $34,000 in annual profits (Table 39). The magnitude of impact varies by activity; however, fishing incurs a higher maximum potential loss than consumptive diving in the new MPAs. The activity that is most impacted is charter/party boat fishing, with a maximum potential loss of 10,490 person-days (6.95% of this activity in the CINMS), followed by private boat fishing with 9,625 person-days, charter/party boat diving with 1,423 person-days and private boat diving with 827 person-days (Table 37). In terms of income generated by the activity, charter/party boat fishing has a maximum potential loss of about $736,000, followed by private boat fishing with $501,000, charter/party boat diving with $122,000 and private boat diving with $28,000.

Zone Types

One of the new zones in Alternative 1, Anacapa Island, is a marine conservation area. This zone allows for the commercial and recreational take of lobster and recreational take of pelagic finfish. Although recreational fishing or consumptive diving data by species was not collected, the Recreational Fisheries Information Network (RecFIN) fishing location add-on to the Marine Recreational Fishery Statistics Survey (MRFSS) was used to estimate the proportion of recreational pelagic finfish by CDFG fish block. Using this proportion to eliminate pelagic finfish from the analysis, the model only takes into account prohibited species of finfish for this zone. Unfortunately, the sample did not include data for recreational taking of lobsters. As a result, this analysis may be an overestimate of actual maximum potential impact.

Impact by Jurisdiction

There is a disproportional impact by jurisdiction (additional State versus Federal waters) since density of recreational activity increases as one moves towards the islands. Additional State waters accounted for 20.39% of the Alternative 1 MPA area, while the remaining 79.61% is in Federal waters. However, 33% of the maximum potential loss for new MPAs in Alternative 1 occurs in State waters, compared with 67% in Federal waters.

While the current regulatory action only impacts about 5% of the annual activity and other associated socioeconomic impact measurements estimated here, the existing State MPAs impact 13.8% of the annual person-days of consumptive recreation in the CINMS. Displacement from the existing State MPAs has an estimated maximum potential annual loss of about $3.275 million in income and 138 full and part-time jobs in the local county economies. This is an additional percentage impact of about 12.4% of income and 12.1% of employment generated. Consumer's surplus[23] losses from displacement from the existing State MPAs are estimated to be about $2.2 million and annual lost profits to charter/party boat operations are estimated to be about $58,000 (11% of all charter/party boat operation profits from activities in the CINMS). The estimated cumulative impact of the current regulatory action for this alternative is estimated to have an annual maximum potential loss of about 84,000 person-days of consumptive recreation, which is about 18.8% of all consumptive recreation in the CINMS. This displacement has an associated income impact of about $4.66 million and 200 full and part-time jobs in the local county economies (17.7% and 17.5% of all the income and employment generated by consumptive recreation in the CINMS, respectively). Cumulative annual maximum potential loss in consumer's surplus is estimated to be about $3 million, while annual lost profits

[23] Consumer Surplus is the amount that a person is willing to pay for a good or service over and above what they actually have to pay for a good or service. The value received is a surplus or net benefit. And, for natural resources, for which no one owns the resources and can't charge a price for use of the resources, consumer's surplus is referred to as a nonmarket economic value since the goods and services from the natural resources are not traded in markets. Consumer's surplus is applicable to both use and nonuse or passive use value.

to charter/party boat operations is estimated to be about $92,000 annually or 17.6% of the total annual profits of the charter/party boat operations from activity in the CINMS (Table 36).

Table 36 Summary of Consumptive Recreation Activities, Alternative (Step 1 Analysis)

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	7,361	1.6	15,005	3.3	22,365	5.0	61,651	13.8	84,016	18.8
Market Impact										
Direct Sales	$832,585	1.7	$1,718,897	3.5	$2,551,482	5.2	$6,037,997	12.4	$8,589,479	17.7
Direct Wages and Salaries	$319,563	1.7	$660,289	3.5	$979,852	5.2	$2,322,681	12.4	$3,302,533	17.7
Direct Employment	17.0	1.8	35.7	3.7	52.7	5.4	117.6	12.1	170.3	17.5
Total Income	$452,604	1.7	$935,292	3.5	$1,387,895	5.3	$3,275,128	12.4	$4,663,023	17.7
Total Employment	19.9	1.7	41.6	3.7	61.5	5.4	138.1	12.1	199.6	17.5
Non-Market Impact										
Consumer's Surplus	$260,869	1.6	$532,300	3.4	$793,168	5.0	$2,170,769	13.7	$2,963,937	18.7
Profit[1]	$10,693	2.0	$23,457	4.5	$34,151	6.5	$57,876	11.0	$92,027	17.6

[1].Profit is used as a proxy for producer's surplus. Producer Surplus is the amount received by producers of a good or service over and above what they would be willing to supply the service, which includes the cost of production plus a normal return on investment.

Table 37 Consumptive Recreation, Maximum Potential Loss - Alternative 1

	Charter Boat Fishing		Charter Boat Diving		Private Boat Fishing		Private Boat Diving	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	3,121	2.07%	673	1.87%	3,226	1.51%	340	0.72%
Market Impact								
Direct Sales	$ 405,231	2.06%	$ 101,462	1.75%	$ 304,140	1.51%	$ 21,752	0.72%
Direct Wages and Salaries	$ 153,671	2.06%	$ 37,136	1.76%	$ 120,616	1.51%	$ 8,140	0.72%
Direct Employment	9.4	2.06%	2	1.68%	5.0	1.50%	0.4	0.81%
Total Income	$ 219,443	2.06%	$ 53,675	1.76%	$ 168,158	1.51%	$ 11,328	0.72%
Total Employment	10.8	2.06%	3	1.69%	6.1	1.50%	0.5	0.76%
Non-Market Impact								
Consumer's Surplus	$ 112,659	2.07%	$ 24,309	1.87%	$ 112,091	1.51%	$ 11,810	0.72%
Profit1	$ 9,260	2.07%	$ 1,434	1.87%	n/a	n/a	n/a	n/a
Federal								
Person-days	7,369	4.88%	750	2.08%	6,399	2.99%	487	1.03%
Market Impact								
Direct Sales	$ 954,719	4.86%	$ 129,720	2.24%	$ 603,298	2.99%	$ 31,160	1.03%
Direct Wages and Salaries	$ 362,097	4.86%	$ 47,275	2.24%	$ 239,256	2.99%	$ 11,661	1.03%
Direct Employment	22.2	4.86%	3	2.30%	10	2.99%	0.5	1.01%
Total Income	$ 517,050	4.86%	$ 68,455	2.24%	$ 333,560	2.99%	$ 16,228	1.03%
Total Employment	25.5	4.85%	3	2.28%	12.1	2.99%	0.6	1.02%
Non-Market Impact								
Consumer's Surplus	$ 265,979	4.88%	$ 27,057	2.08%	$ 222,346	2.99%	$ 16,917	1.03%
Profit1	$ 21,862	4.88%	$ 1,596	2.08%	n/a	n/a	n/a	n/a
Total New								
Person-days	10,490	6.95%	1,423	3.96%	9,625	4.50%	827	1.75%
Market Impact								
Direct Sales	$ 1,359,950	6.93%	$ 231,182	4.00%	$ 907,438	4.50%	$ 52,912	1.75%
Direct Wages and Salaries	$ 515,768	6.93%	$ 84,411	3.99%	$ 359,872	4.50%	$ 19,801	1.75%
Direct Employment	32	6.91%	5	3.98%	15	4.49%	1	1.81%
Total Income	$ 736,493	6.93%	$ 122,130	3.99%	$ 501,718	4.50%	$ 27,556	1.75%
Total Employment	36	6.91%	6	3.97%	18	4.50%	1	1.78%
Non-Market Impact								
Consumer's Surplus	$ 378,638	6.95%	$ 51,366	3.96%	$ 334,438	4.50%	$ 28,727	1.75%
Profit1	$ 31,121	6.95%	$ 3,029	3.96%	n/a	n/a	n/a	n/a
Existing State								
Person-days	15,167	10.05%	6,051	16.82%	28,320	13.23%	12,113	25.67%
Market Impact								
Direct Sales	$ 1,982,725	10.10%	$ 610,031	10.54%	$2,670,013	13.23%	$ 775,228	25.67%
Direct Wages and Salaries	$ 751,541	10.10%	$ 222,151	10.51%	$1,058,873	13.23%	$ 290,116	25.67%
Direct Employment	46	10.13%	14	11.03%	44	13.24%	13	25.60%
Total Income	$ 1,073,389	10.10%	$ 321,779	10.52%	$1,476,236	13.23%	$ 403,725	25.67%
Total Employment	53.2	10.12%	17	10.95%	53.3	13.24%	15	25.61%
Non-Market Impact								
Consumer's Surplus	$ 547,449	10.05%	$ 218,392	16.82%	$ 984,039	13.23%	$ 420,889	25.67%
Profit1	$ 44,996	10.05%	$ 12,880	16.82%	n/a	n/a	n/a	n/a
Cumulative Total								
Person-days	25,658	17.01%	7,474	20.77%	37,945	17.73%	12,940	27.42%
Market Impact								
Direct Sales	$ 3,342,675	17.03%	$ 841,213	14.54%	$3,577,451	17.73%	$ 828,140	27.42%
Direct Wages and Salaries	$ 1,267,309	17.03%	$ 306,562	14.51%	$1,418,745	17.73%	$ 309,917	27.42%
Direct Employment	78	17.04%	20	15.01%	59	17.73%	14	27.42%
Total Income	$ 1,809,882	17.03%	$ 443,908	14.52%	$1,977,953	17.73%	$ 431,281	27.42%
Total Employment	89	17.03%	23	14.91%	71	17.73%	16	27.40%
Non-Market Impact								
Consumer's Surplus	$ 926,087	17.01%	$ 269,758	20.77%	$1,318,477	17.73%	$ 449,616	27.42%
Profit1	$ 76,117	17.01%	$ 15,909	20.77%	n/a	n/a	n/a	n/a

1. Profit is used as a proxy for producer's surplus.

5.2.3.2 Alternative 1 – Step 2 Analysis (Recreational Consumptive Activities)

This regulatory alternative was estimated to potentially impact an additional 5% of the consumptive recreational activities in the CINMS. This alternative is weighted towards adding to the existing State marine reserves more than to marine conservation areas. Still, 5% of all consumptive recreation is a relatively low amount of activity and there would be a fairly high probability that adequate substitute areas could be found and significantly mitigate the short-term impacts. There may be little loss in total activity and the associated impacts on the local county economies; however, there will be some loss in consumer's surplus, but much less than estimated in Step 1 analysis. The main costs in the short-term will most likely come from added search costs in locating substitute sites.

In the long-term, losses would be further mitigated once adequate substitute sites are located. The size of the displacements is not large enough to result in crowding or congestion effects. This conclusion must be tempered with respect to rockfish, since the Rockfish Conservation Areas and Groundfish Closure areas cover so much of the CINMS that there are few places to find adequate substitutes. Recent regulations have relaxed some of the restrictions on the recreational fisheries and allow more recreational fishing. These actions will allow greater opportunities for recreational fishermen to find adequate substitute sites and mitigate any losses. There is a possibility under this alternative for there to be benefits from "edge effects" and/or spillover/replenishment effects from marine reserves. Of course, whether there are net benefits to consumptive recreation users depends on the complex mix of ecological and socioeconomic responses. If there are losses, it can be expected that they will be much smaller than estimated in Step 1 analysis and there is a possibility of net long-term gains to consumptive recreation.

Cumulative Impacts

In step 1 analysis, this regulatory alternative potentially impacts 18.8% of all person-days of consumptive recreation activity in the CINMS. Most of the impact is attributed to the existing State MPAs. Additional costs of substituting to other sites could be expected, but much less than estimated in Step 1 analysis. Much of the cost may involve additional search costs of locating good substitute sites. Economists usually assume that there would be some loss in consumer's surplus, since those engaged in consumptive recreation are forced to make choices to go to new sites. The fact that they chose these sites to begin with is evidence that they valued these sites more highly. Some losses in the short-term can be expected, but much less than estimated in Step 1.

In the long-term, there is more time to learn about substitute sites and increase success in fishing and other consumptive activities. In addition, if there are "edge effects" or spillover/ replenishment effects that have been noted elsewhere from the more complete network of existing and newly proposed MPA extensions, there is a possibility of net economic benefits to consumptive recreation. But like in the case of the commercial fisheries this conclusion will depend on the net interaction between the biophysical system and the human system. The human

system includes fishery management. As was noted by Sanchirico (2005), in analysis of how the commercial fisheries might be impacted by marine reserves, some of the same conclusions are relevant. If rational fishery management is not applied there are likely benefits from marine reserves. Rational fishery management here might be focused on allocation issues between commercial and recreational fisheries. Currently, there is little discussion of management that would maximize the economic value of the fisheries and allocating fisheries based on their highest economic use. Given the lack of rational fishery management, marine reserves may provide long-term benefits to recreational fisheries and other consumptive recreation.

As with the commercial fisheries, if recreational consumptive users do not accept the proposed regulations this may increase social costs through administrative activities and lawsuits challenging the regulation or low compliance resulting in higher enforcement costs. These social costs could be mitigated or avoided through agreements with users to address uncertainties of the effects of marine reserves through both ecological and socioeconomic monitoring and education and outreach efforts.

For discussion of the effects of other regulations that can work towards mitigating, offsetting, avoiding costs, or increasing the costs, refer to section 5.2.2.2.

In the Step 2 analyses of this section, the effect of possible mitigating factors on estimated Step 1 losses to consumptive users is investigated. Although these issues are addressed quantitatively where possible, the discussion is largely qualitative because it is generally not possible to quantify mitigating factors and benefits. Even though substitution and the long-term benefits from replenishment effects were discussed in a previous section, for this section, these two important mitigating factors are revisited with a more pointed discussion about how they relate to recreation. Unlike the commercial fisheries, there is very little in the literature that addresses recreational fishing or other consumptive recreation and the impact of marine reserves once recreational behavior is modeled. The Sanchirico and Wilen (2001) and Sanchirico (2004 and 2005) studies have not attempted to model a bioeconomic model of recreational fishing in a spatial context. Random Utility Models (RUMs), now commonly used to model recreational behavior, do model spatial decision-making based on the relative cost of accessing sites and site attributes. The main focus of RUMs is to model substitution across sites, so the models are well suited to address the issue of marine reserves ex post. Review of the literature did not uncover any analyses of marine reserves and recreational behavior, especially any that could be used to speculate on a range of outcomes ex ante, as is required here. Table 38 provides a review of the impacts to recreational consumptive activities.

Table 38 Recreational Consumptive Activities - Impacts Relative to Step 1 Analysis

Factors	Short-term	Long-term
1. Status of Fishing Stocks	O	O to o
2. Replenishment Effects	o	n
3. Substitution/Relcoation	O to o	O to o
4. Crowding/Congestion Effects	l	l
5. Quality Increases in Marine Reserves	O	O
6. Other Regulations		
a) Regulated Inefficiency	o	o
b) Proposition 132 (Gillnet Restriction)	l	l
c) Allocations to Other User Groups	l	l
d) Cowcod Closure	l	o
e) Opening up some Cowcod Closure Areas	o	o
f) MLPA - Closed Areas	O	O
g) MLMA Fishery Management Plans	O	O
h) ITQs currently not being considered	O	O
I) Existing Area Closures	O to o	O to o
j) Temporal Closures	l	l
k) Economic Conditions and Outside and Internal Forces	l	l
l) Rockfish Conservation Areas	O to o	o to l
m) Groundfish Closures	O to o	o to l
n) Spot Prawn Trawling Prohibition	O to o	o to l
7. Pelagic Species	o	o
8. Phasing	o	o
All Factors	O to l	o to n

O = Neutral Impact
l = Increase in costs from Step 1
o = Decrease in costs from Step 1
n = No costs from Step 1 - instead, benefits

5.2.3.3 Alternative 2 - Step 1 Analysis (Recreational Consumptive Activities)

This regulatory alternative displaces about 6.4% of the annual person-days of consumptive recreation in the CINMS. The estimated maximum potential loss associated with this displacement is about $1.8 million in annual income and about 79 full and part-time jobs in the local county economies. Annual consumer's surplus loss to displaced consumptive recreators is estimated to be about $1 million. Charter/party boat operations could potentially lose about $45,000 in annual profits (Table 39). The magnitude of impact varies by activity; however, the maximum potential loss for fishing activities is more than twice as high than for diving activities. The activity that is most impacted is charter/party boat fishing, with a maximum potential loss of 14,007 person-days (9.28% of this activity in the CINMS), followed by private boat fishing with 12,149 person-days, charter/party boat diving with 1,613 person-days and private boat diving with 869 person days (Table 40). In terms of income generated by the activity, charter/party boat fishing has a maximum potential loss of about $983,000, followed by private boat fishing with $633,000, charter/party boat diving with $138,000 and private boat diving with $29,000.

Zone Types

One of the new zones in Alternative 2, Anacapa Island, is a marine conservation area. This type of zone allows for the commercial and recreational take of lobster and recreational take of pelagic finfish. Although recreational fishing or consumptive diving data by species was not collected, the RecFIN fishing location add-on to the MRFSS was used to estimate the proportion of recreational pelagic finfish by CDFG fish block. Using this proportion to eliminate pelagic finfish from the analysis, the model only takes into account prohibited species of finfish for these reserves. Unfortunately, the sample did not include data for recreational taking of lobsters. As a result, this analysis may be an overestimate of actual maximum potential impact.

Impact by Jurisdiction

There is a disproportional impact by jurisdiction (additional State versus Federal waters) since density of recreational activity increases as one moves towards the islands. Additional State waters accounted for 17.58% of the Alternative 2 MPA area, while the remaining 82.42% is in Federal waters. However, 26% of the maximum potential loss for new MPAs in Alternative 2 occurs in State waters, compared with 74% in Federal waters.

While the current regulatory action only impacts about 6.4% of the annual activity and other associated socioeconomic impact measurements estimated here, the existing State MPAs impact 13.8% of the annual person-days of consumptive recreation in the CINMS. Displacement from the existing State MPAs has an estimated maximum potential annual loss of about $3.275 million in income and 138 full and part-time jobs in the local county economies. This is an additional percentage impact of about 12.4% of income and 12.1% of employment generated. Consumer's surplus losses from displacement from the existing State MPAs are estimated to be about $2.2 million and annual lost profits to charter/party boat operations are estimated to be

about $58,000 (11% of all charter/party boat operation profits from activities in the CINMS). The estimated cumulative impact of the current regulatory action for this alternative is estimated to have an annual maximum potential loss of about 90,300 person-days of consumptive recreation, which is about 20.2% of all consumptive recreation in the CINMS. This displacement has an associated income impact of about $5 million and 217 full and part-time jobs in the local county economies (19.2% and 19.1% of all the income and employment generated by consumptive recreation in the CINMS, respectively). Cumulative annual maximum potential loss in consumer's surplus is estimated to be about $3.2 million, while annual lost profits to charter/party boat operations is estimated to be about $103,000 annually or 19.6% of the total annual profits of the charter/party boat operations from activity in the CINMS (Table 39).

Table 39 Consumptive Recreation Activities - Alternative 2 (Step 1 Analysis)

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	7,562	1.7	21,075	4.7	28,637	6.4	61,651	13.8	90,288	20.2
Market Impact										
Direct Sales	$855,662	1.8	$2,422,169	5.0	$3,277,831	6.7	$6,037,997	12.4	$9,315,828	19.2
Direct Wages and Salaries	$328,466	1.8	$930,955	5.0	$1,259,421	6.7	$2,322,681	12.4	$3,582,102	19.2
Direct Employment	17.5	1.8	50.5	5.2	68.0	7.0	117.6	12.1	185.6	19.1
Total Income	$465,200	1.8	$1,318,509	5.0	$1,783,709	6.8	$3,275,128	12.4	$5,058,837	19.2
Total Employment	20.5	1.8	58.9	5.2	79.3	7.0	138.1	12.1	217.4	19.1
Non-Market Impact										
Consumer's Surplus	$267,987	1.7	$748,105	4.7	$1,016,093	6.4	$2,170,769	13.7	$3,186,861	20.1
Profit[1]	$10,973	2.1	$34,012	6.5	$44,986	8.6	$57,876	11.0	$102,862	19.6

[1] Profit is used as a proxy for producer's surplus.

Table 40 Consumptive Recreation - Maximum Potential Loss (Alternative 2)

	Charter Boat Fishing		Charter Boat Diving		Private Boat Fishing		Private Boat Diving	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	3,204	2.12%	690	1.92%	3,337	1.56%	331	0.70%
Market Impact								
Direct Sales	$ 416,159	2.12%	$ 103,725	1.79%	$ 314,605	1.56%	$ 21,173	0.70%
Direct Wages and Salaries	$ 157,809	2.12%	$ 37,967	1.80%	$ 124,766	1.56%	$ 7,924	0.70%
Direct Employment	9.7	2.12%	2	1.76%	5.2	1.56%	0.3	0.60%
Total Income	$ 225,356	2.12%	$ 54,875	1.79%	$ 173,944	1.56%	$ 11,027	0.70%
Total Employment	11.2	2.12%	3	1.75%	6.3	1.55%	0.4	0.68%
Non-Market Impact								
Consumer's Surplus	$ 115,636	2.12%	$ 24,908	1.92%	$ 115,948	1.56%	$ 11,495	0.70%
Profit1	$ 9,504	2.12%	$ 1,469	1.92%	n/a	n/a	n/a	n/a
Federal								
Person-days	10,803	7.16%	923	2.56%	8,812	4.12%	538	1.14%
Market Impact								
Direct Sales	$ 1,398,939	7.13%	$ 157,999	2.73%	$ 830,792	4.12%	$ 34,439	1.14%
Direct Wages and Salaries	$ 530,594	7.13%	$ 57,998	2.74%	$ 329,475	4.12%	$ 12,888	1.14%
Direct Employment	32.5	7.11%	4	2.83%	14	4.10%	0.6	1.21%
Total Income	$ 757,642	7.13%	$ 83,592	2.73%	$ 459,341	4.12%	$ 17,935	1.14%
Total Employment	37.4	7.11%	4	2.81%	16.6	4.11%	0.7	1.19%
Non-Market Impact								
Consumer's Surplus	$ 389,917	7.16%	$ 33,301	2.56%	$ 306,190	4.12%	$ 18,698	1.14%
Profit1	$ 32,048	7.16%	$ 1,964	2.56%	n/a	n/a	n/a	n/a
Total New								
Person-days	14,007	9.28%	1,613	4.48%	12,149	5.68%	869	1.84%
Market Impact								
Direct Sales	$ 1,815,098	9.25%	$ 261,724	4.52%	$1,145,397	5.68%	$ 55,612	1.84%
Direct Wages and Salaries	$ 688,403	9.25%	$ 95,965	4.54%	$ 454,241	5.68%	$ 20,812	1.84%
Direct Employment	42	9.23%	6	4.59%	19	5.66%	1	1.81%
Total Income	$ 982,998	9.25%	$ 138,466	4.53%	$ 633,284	5.68%	$ 28,962	1.84%
Total Employment	49	9.23%	7	4.56%	23	5.66%	1	1.87%
Non-Market Impact								
Consumer's Surplus	$ 505,553	9.28%	$ 58,209	4.48%	$ 422,138	5.68%	$ 30,193	1.84%
Profit1	$ 41,553	9.28%	$ 3,433	4.48%	n/a	n/a	n/a	n/a
Existing State								
Person-days	15,167	10.05%	6,051	16.82%	28,320	13.23%	12,113	25.67%
Market Impact								
Direct Sales	$ 1,982,725	10.10%	$ 610,031	10.54%	$2,670,013	13.23%	$ 775,228	25.67%
Direct Wages and Salaries	$ 751,541	10.10%	$ 222,151	10.51%	$1,058,873	13.23%	$ 290,116	25.67%
Direct Employment	46	10.13%	14	11.03%	44	13.24%	13	25.60%
Total Income	$ 1,073,389	10.10%	$ 321,779	10.52%	$1,476,236	13.23%	$ 403,725	25.67%
Total Employment	53.2	10.12%	17	10.95%	53.3	13.24%	15	25.61%
Non-Market Impact								
Consumer's Surplus	$ 547,449	10.05%	$ 218,392	16.82%	$ 984,039	13.23%	$ 420,889	25.67%
Profit1	$ 44,996	10.05%	$ 12,880	16.82%	n/a	n/a	n/a	n/a
Cumulative Total								
Person-days	29,174	19.34%	7,663	21.30%	40,469	18.91%	12,982	27.51%
Market Impact								
Direct Sales	$ 3,797,823	19.34%	$ 871,755	15.07%	$3,815,410	18.91%	$ 830,840	27.51%
Direct Wages and Salaries	$ 1,439,944	19.34%	$ 318,116	15.05%	$1,513,114	18.91%	$ 310,928	27.51%
Direct Employment	89	19.36%	20	15.62%	63	18.90%	14	27.42%
Total Income	$ 2,056,387	19.34%	$ 460,245	15.05%	$2,109,520	18.91%	$ 432,687	27.51%
Total Employment	102	19.35%	23	15.51%	76	18.90%	16	27.48%
Non-Market Impact								
Consumer's Surplus	$ 1,053,001	19.34%	$ 276,601	21.30%	$1,406,177	18.91%	$ 451,082	27.51%
Profit1	$ 86,549	19.34%	$ 16,313	21.30%	n/a	n/a	n/a	n/a

1. Profit is used as a proxy for producer's surplus.

Alternative 2 – Step 2 Analysis (Consumptive Recreational Activities)

This regulatory alternative was estimated to potentially impact an additional 6.4% of the consumptive recreational activities in the CINMS. This alternative is the alternative with the greatest potential impact because of its increased size over the other alternative and the fact that it is more heavily weighted towards adding to the existing State marine reserves than to marine conservation areas, and therefore displaces significantly more consumptive recreation than Alternative 1. Still, 6.4% of all consumptive recreation is a relatively low amount of activity and there would be a fairly high probability that adequate substitute areas could be found and significantly mitigate the short-term impacts. There may be little loss in total activity and the associated impacts on the local county economies; however, there will be some loss in consumer's surplus, but much less than estimated in Step 1 analysis. The main costs in the short-term would most likely come from added search costs in locating substitute sites.

In the long-term, losses would be further mitigated once adequate substitute sites are located. The size of the displacements is not large enough to result in crowding or congestion effects. This conclusion must be tempered with respect to rockfish, since the Rockfish Conservation Areas and Groundfish Closure areas cover so much of the CINMS that there are few places to find adequate substitutes. Recent regulations have relaxed some of the restrictions on the recreational fisheries and allow more recreational fishing. These actions will allow greater opportunities for recreational fishermen to find adequate substitute sites and mitigate any losses. There is a higher probability under this alternative than Alternative 1 for there to be benefits from "edge effects" and/or spillover/replenishment effects from marine reserves. Of course, whether there are net benefits to consumptive recreation users still depends on the complex mix of ecological and socioeconomic responses. If there are losses, it can be expected that they will be much smaller than estimated in Step 1 analysis and there is a possibility of net long-term gains to consumptive recreation.

Cumulative Impacts

In step 1 analysis, this regulatory alternative potentially impacts 20.2% of all person-days of consumptive recreation activity in the CINMS. Most of the impact is attributed to the existing State MPAs. One might expect additional costs of substituting to other sites, but much less than estimated in Step 1 analysis. Much of the cost may involve additional search costs of locating good substitute sites. Economists usually assume that there would be some loss in consumer's surplus, since those engaged in consumptive recreation are forced to make choices to go to new sites. The fact that they chose these sites to begin with is evidence that they valued these sites more highly. Some losses in the short-term are expected, but much less than estimated in Step 1.

In the long-term, there is more time to learn about substitute sites and increase success in fishing and other consumptive activities. In addition, if there are "edge effects" or spillover/ replenishment effects that have been noted elsewhere from the more complete network of existing and newly proposed MPA extensions, there is a possibility of net economic benefits to

consumptive recreation. But like in the case of the commercial fisheries this conclusion will depend on the net interaction between the biophysical system and the human system. The human system includes fishery management. As was noted by Sanchirico (2005), in analysis of how the commercial fisheries might be impacted by marine reserves, some of the same conclusions are relevant. If rational fishery management is not applied there are likely benefits from marine reserves. Rational fishery management here might be focused on allocation issues between commercial and recreational fisheries. Currently, there is little discussion of management that would maximize the economic value of the fisheries and allocating fisheries based on their highest economic use. Marine reserves may provide long-term benefits to recreational fisheries and other consumptive recreation.

As with the commercial fisheries, if recreational consumptive users do not accept the proposed regulations this may increase social costs through administrative activities and lawsuits challenging the regulation or low compliance that may result in higher enforcement costs. These social costs could be mitigated or avoided through agreements with users to address uncertainties of the effects of marine reserves through both ecological and socioeconomic monitoring and education and outreach efforts.

For discussion of the effects of other regulations that can work towards mitigating, offsetting, avoiding costs, or increasing the costs, refer to sections 5.2.2.2 and 5.2.2.2.

5.2.4 Total of All Consumptive Activities

Alternative 1 has an estimated additional potential impact of about $2.3 million in lost income compared to almost $3.1 million in additional lost income by Alternative 2. Alternative 1 potentially impacts 1.40% of all the income generated by consumptive activities in the CINMS compared to 2.01% for Alternative 2. Results are similar for employment (Table 41).

Table 41 All Consumptive Activities - Summary of Impacts by Alternative (Step 1 Analysis)

Alternative	Additional State waters	1%	Federal waters	%	Total New Proposal	%	Existing State MPAs	%	Cumulative Total	%
Income[2]										
1	$952,391	0.97	$1,374,953	1.4	$2,327,343	2.37	$11,819,524	12.1	$14,146,867	14.4
2	$1,123,643	1.15	$1,968,127	2.01	$3,091,770	3.15	$11,819,524	12.1	$14,911,294	15.2
Employment[3]										
1	35	1.1	55	1.8	90	2.9	384	12.4	474	15.3
2	41	1.3	78	2.5	119	3.8	384	12.4	503	16.3

1. Percents are the percent of total baseline.
2. Income is total income, including multiplier impacts. Baseline is equal to $26,416,557.

3. Employment is total employment, including multiplier impacts. Baseline is 1,138 full and part-time jobs.

5.2.5 Non-Consumptive Recreational Activities

In addition to benefits derived from replenishment effects, the establishment of marine reserve systems is expected to result in benefits to non-consumptive recreational users (e.g., wildlife viewers, divers). These increased benefits take the form of increases in diversity of wildlife, viewing opportunities from increased abundance of fish and invertebrates, water quality, etc. Benefits may also be derived from the decrease in the density of users or in the reduction in conflicts with consumptive users. There is no data currently available to directly estimate the magnitude of these benefits. In light of this fact a simulation is conducted for each alternative using a range of increases in quality and of elasticities. Quality elasticities show the percentage change in consumer's surplus for a percentage change in quality. In a paper by Freeman (1995), 13 studies were summarized on marine recreation, which contained enough information to calculate quality elasticities. Catch rate was the quality variable in all the studies in Freeman (1995). In a paper by Bockstael, *et al*. (1989) there was enough information to calculate quality elasticities for swimming, boating and fishing in the Chesapeake Bay. See Appendix G in Leeworthy and Wiley (2005) for the derivation of these elasticities. Using the range of quality elasticities and the assumption of a 10, 50, and 100 percent increase in quality, benefit estimates were calculated for each alternative. To avoid skewed results from outliers, the highest and lowest elasticities were dropped from this range.

For each alternative, four tables are provided. The first three tables report baseline 1999 activity within each alternative and their corresponding economic impact. More detailed tables are included in Appendix C of Leeworthy and Wiley (2005) for the baseline. The fourth table presents a range of potential impacts using a range of quality increases and quality elasticities. Quality increases are expected to grow over time. Elasticities also have a time dimension and in the short-term are smaller (less behavioral response to quality) and larger over the long-term (greater behavioral response). The number in the upper left corner of the tables reflects the smallest changes and the lower right corner of the tables yield the largest potential changes.

One other important point to bear in mind is that data was only available for charter/party boat non-consumptive recreation. This section does not take into account private boat non-consumptive use, for which there was no data available. Therefore estimates of aggregate benefits presented here will tend to underestimate true benefits due to the exclusion of private boat non-consumptive use in the calculations. A two-year study is now underway to quantify the amount of use, the economic value of use (both market and nonmarket economic value) and how these values change using a random utility model. The study also will attempt to relate uses to quality attributes so quality elasticities can be estimated.

It is also important to point out that in the 'benefits transfer/policy analysis simulation" four different measurements are addressed: 1) Consumer's surplus, 2) Income generated in the local county economies, 3) Employment generated in the local county economies and 4) Person-days of activity. The quality elasticities are directly applicable to consumer's surplus. In a paper by Smith and Kaoru (1990) about 200 recreation value studies were summarized in a Meta analysis. One of the measures reported was the own price elasticity of demand. The range of own price elasticities were about the same as the range of quality elasticities, so this range of elasticities was used on all four concepts.

In the years 1999-2000, it is estimated that 6.3 million people age 16 or older from U.S. households participated in either bird watching, viewing other wildlife, viewing scenery or doing photography in the marine environment of California. They spent over 120.2 million days in these activities (Leeworthy 2001b and Leeworthy and Wiley 2001c). As a comparison, the same study estimated 2.7 million participants that participated in 20.3 million days of saltwater recreational fishing. Given the above estimates, the private boat non-consumptive use of the CINMS may be quite large.

5.2.5.1 Alternative 1 – Step 2 Analysis (Non-Consumptive Recreational Activities)

The baseline activity occurring in the newly protected areas amounts to 956 person-days or 2.3% of all nonconsumptive recreation from charter/party/guide operations in the CINMS. This is still a relatively small addition because most nonconsumptive recreation in the CINMS takes place in State waters closer to the islands. The aggregate economic impact on income associated with this activity is estimated to be about $84,300, which supports about 4 full or part-time jobs (Table 42). In terms of person-days of activity, nonconsumptive diving was the lead activity with 439 person-days followed by whale watching with 433 person-days and sailing with 84 person-days (Table 43). There were no kayaking/sightseeing activities conducted in the new MPAs for this alternative. Whale watching is the most significant activity in Federal water portions of the proposed protected areas accounting for about 37 of the person-days of nonconsumptive recreation in the proposed new MPA areas.

The results of the "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional MPAs are summarized in Table 44. In terms of person-days of activity, the added activity could range from a low of just four person-days for a 10 percent increase in quality and a quality elasticity of 0.04 to a high of 4,301 additional person-days for a quality increase of 100 and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $337 and about $380,000. Consumer's surplus to nonconsumptive recreators is estimated to range from $138 to $155,000.

Cumulative Impact

The existing State MPAs account for most of the potential improvement for nonconsumptive recreators. Across all MPAs, 7,554 person-days of nonconsumptive recreation took place in the

1999 baseline year. This was 18 of all the nonconsumptive recreation by access to the CINMS by charter/party boat and guide services. It was estimated that this activity generated about $679,000 in income and about 36 full and part-time jobs in the local county economies. This activity also generated about $89,000 in profits to charter/party boat and guide service operations and an estimated consumer's surplus to the nonconsumptive recreators of $272,700 (Table 45).

The results of the "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional and existing MPAs are summarized in Table 45. In terms of person-days of activity, the added activity could range from a low of just 30 person-days for a 10 increase in quality and a quality elasticity of 0.04 to a high of 33,994 additional person-days for a quality increase of 100 and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $2,717 and about $3 million. Consumer's surplus to nonconsumptive recreators is estimated to range from $1,091 to $1.2 million.

Table 42 Summary: Non-consumptive Recreation Activities - Alternative 1 - Economic Impact

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	313	0.7%	643	1.5%	956	2.3%	6,598	15.7%	7,554	18.0%
Market Impact										
Direct Sales	$ 50,288	0.7%	$ 110,055	1.6%	$ 160,343	2.3%	$ 1,130,945	15.9%	$ 1,291,288	18.2%
Direct Wages and Salaries	$ 18,313	0.7%	$ 40,025	1.6%	$ 58,338	2.3%	$ 411,290	15.9%	$ 469,628	18.2%
Direct Employment	1.1	0.6%	2.6	1.5%	3.7	2.1%	27.9	16.0%	31.6	18.2%
Total Income	$ 26,455	0.7%	$ 57,861	1.6%	$ 84,316	2.3%	$ 594,579	15.9%	$ 678,895	18.2%
Total Employment	1.3	0.6%	3.0	1.5%	4.2	2.1%	31.9	16.0%	36.1	18.1%
Non-Market Impact										
Consumer's Surplus	$ 11,291	0.7%	$ 23,205	1.5%	$ 34,496	2.3%	$ 238,166	15.7%	$ 272,662	18.0%
Profit1	$ 4,626	0.8%	$ 7,956	1.3%	$ 12,582	2.1%	$ 76,791	12.6%	$ 89,373	14.6%

1. Profit is used as a proxy for producer's surplus.

Table 43 Non-consumptive Recreation - Economic Impact - Alternative 1

	Whale Watching		NC Diving		Sailing		Kayaking/Sightseeing	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	82	0.32%	207	1.92%	24	0.61%	-	0.00%
Market Impact								
Direct Sales	$ 13,572	0.32%	$ 33,369	1.81%	$ 3,347	0.47%	$ -	0.00%
Direct Wages and Salaries	$ 4,940	0.32%	$ 12,155	1.82%	$ 1,218	0.47%	$ -	0.00%
Direct Employment	0.3	0.29%	0.8	1.77%	-	0.00%	-	0.00%
Total Income	$ 7,138	0.32%	$ 17,557	1.81%	$ 1,760	0.47%	$ -	0.00%
Total Employment	0.4	0.29%	0.9	1.74%	-	0.00%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 2,958	0.32%	$ 7,456	1.92%	$ 877	0.61%	$ -	0.00%
Profit1	$ 870	0.32%	$ 3,756	1.92%	$ 830	0.61%	$ -	0.00%
Federal								
Person-days	351	1.35%	233	2.16%	59	1.48%	-	0.00%
Market Impact								
Direct Sales	$ 58,484	1.36%	$ 41,530	2.26%	$ 10,041	1.41%	$ -	0.00%
Direct Wages and Salaries	$ 21,285	1.36%	$ 15,087	2.25%	$ 3,653	1.41%	$ -	0.00%
Direct Employment	1.4	1.34%	1.0	2.21%	0	1.13%	-	0.00%
Total Income	$ 30,759	1.36%	$ 21,823	2.26%	$ 5,280	1.41%	$ -	0.00%
Total Employment	1.6	1.34%	1.2	2.22%	0.2	0.99%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 12,659	1.35%	$ 8,402	2.16%	$ 2,145	1.48%	$ -	0.00%
Profit1	$ 3,724	1.35%	$ 4,232	2.16%	$ 2,029	1.48%	$ -	0.00%
Total New								
Person-days	433	1.67%	439	4.08%	84	2.09%	-	0.00%
Market Impact								
Direct Sales	$ 72,056	1.68%	$ 74,899	4.07%	$ 13,388	1.88%	$ -	0.00%
Direct Wages and Salaries	$ 26,225	1.68%	$ 27,242	4.07%	$ 4,871	1.88%	$ -	0.00%
Direct Employment	2	1.63%	2	3.97%	0	1.13%	-	0.00%
Total Income	$ 37,897	1.68%	$ 39,380	4.07%	$ 7,040	1.88%	$ -	0.00%
Total Employment	2	1.64%	2	3.96%	0	0.99%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 15,617	1.67%	$ 15,858	4.08%	$ 3,022	2.09%	$ -	0.00%
Profit1	$ 4,594	1.67%	$ 7,988	4.08%	$ 2,859	2.09%	$ -	0.00%
Existing State								
Person-days	3,878	14.92%	1,959	18.18%	403	10.04%	358	29.07%
Market Impact								
Direct Sales	$ 644,785	15.04%	$ 342,379	18.60%	$ 68,922	9.69%	$ 74,859	29.07%
Direct Wages and Salaries	$ 234,683	15.03%	$ 124,448	18.59%	$ 25,066	9.70%	$ 27,093	29.07%
Direct Employment	16	15.07%	9	18.76%	1.7	9.60%	2.0	29.85%
Total Income	$ 339,123	15.03%	$ 179,956	18.60%	$ 36,236	9.69%	$ 39,265	29.07%
Total Employment	18.0	15.05%	10	18.74%	2.0	9.65%	2.3	29.61%
Non-Market Impact								
Consumer's Surplus	$ 139,971	14.92%	$ 70,708	18.18%	$ 14,549	10.04%	$ 12,938	29.07%
Profit1	$ 41,173	14.92%	$ 35,618	18.18%	$ 13,767	10.04%	$ 777	29.07%
Cumulative Total								
Person-days	4,311	16.59%	2,398	22.26%	487	12.13%	358	29.07%
Market Impact								
Direct Sales	$ 716,841	16.72%	$ 417,278	22.67%	$ 82,310	11.57%	$ 74,859	29.07%
Direct Wages and Salaries	$ 260,908	16.71%	$ 151,690	22.66%	$ 29,937	11.58%	$ 27,093	29.07%
Direct Employment	17	16.70%	10	22.74%	2	10.73%	2	29.85%
Total Income	$ 377,019	16.71%	$ 219,336	22.67%	$ 43,275	11.58%	$ 39,265	29.07%
Total Employment	20	16.69%	12	22.71%	2	10.64%	2	29.61%
Non-Market Impact								
Consumer's Surplus	$ 155,588	16.59%	$ 86,566	22.26%	$ 17,571	12.13%	$ 12,938	29.07%
Profit1	$ 45,767	16.59%	$ 43,606	22.26%	$ 16,627	12.13%	$ 777	29.07%

1. Profit is used as a proxy for producer's surplus.

Table 44 Potential Benefits to Non-consumptive Users from Alternative 1 - Step 2 Analysis

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 138	$ 3,450	$ 15,523
	Income	$ 337	$ 8,432	$ 37,942
	Employment	0.017	0.42	1.89
	Person-days	4	96	430
50%				
	Consumer's Surplus	$ 690	$ 17,248	$ 77,616
	Income	$ 1,686	$ 42,158	$ 189,711
	Employment	0.084	2.10	9.45
	Person-days	19	478	2,150
100%				
	Consumer's Surplus	$ 1,380	$ 34,496	$ 155,233
	Income	$ 3,373	$ 84,316	$ 379,422
	Employment	0.168	4.20	18.90
	Person-days	38	956	4,301

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 1

Table 45 Potential Benefits to Non-consumptive Users from Alternative 1, Cumulative - Step 2 Analysis

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 1,091	$ 27,266	$ 122,698
	Income	$ 2,716	$ 67,889	$ 305,503
	Employment	0.144	3.61	16.22
	Person-days	30	755	3,399
50%				
	Consumer's Surplus	$ 5,453	$ 136,331	$ 613,490
	Income	$ 13,578	$ 339,447	$ 1,527,513
	Employment	0.721	18.03	81.11
	Person-days	151	3,777	16,997
100%				
	Consumer's Surplus	$ 10,906	$ 272,662	$ 1,226,980
	Income	$ 27,156	$ 678,895	$ 3,055,025
	Employment	1.442	36.05	162.23
	Person-days	302	7,554	33,994

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 1.

5.2.5.2 Alternative 2 – Step 2 Analysis (Non-Consumptive Recreational Activities)

This regulatory alternative adds the most protected area that could potentially benefit nonconsumptive recreators among all alternatives. The baseline activity occurring in the newly protected areas amounts to 2,136 person-days or 5.1 of all nonconsumptive recreation from charter/party/guide operations in the CINMS. This is still a relatively small addition because most nonconsumptive recreation in the CINMS takes place in State waters closer to the islands. The aggregate economic impact on income associated with this activity is estimated to be about $187,000, which supports about 10 full or part-time jobs (Table 46). In terms of person-days of activity, whale watching was by far the lead activity with 1,514 person-days followed by nonconsumptive diving with 534 person-days and sailing with 88 person-days (Table 47). There were no kayaking/sightseeing activities conducted in the new MPAs of this alternative. Whale watching is the most significant activity in Federal water portions of the proposed protected areas, accounting for about 59 of the person-days of nonconsumptive recreation in the proposed new MPA areas.

The results of "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional MPAs are summarized in Table 48. In terms of person-days of activity, the added activity could range from a low of just nine person-days for a 10 increase in quality

and a quality elasticity of 0.04 to a high of 9,614 additional person-days for a quality increase of 100 and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $748 and about $841,000. Consumer's surplus to nonconsumptive recreators is estimated to range from $308 to $347,000.

Cumulative Impact

The existing State MPAs account for most of the potential improvement for nonconsumptive recreators. Across all MPAs, 8,735 person-days of nonconsumptive recreation took place in the 1999 baseline year. This was 20.8 of all the nonconsumptive recreation by access to the CINMS by charter/party boat and guide services. It was estimated that this activity generated about $781,000 in income and about 42 full and part-time jobs in the local county economies. This activity also generated about $102,600 in profits to charter/party boat and guide service operations and an estimated consumer's surplus to the nonconsumptive recreators of $315,300 (Table 49).

The results of the "benefits transfer/policy analysis simulation" to estimate a range on the possible benefits of the additional and existing MPAs are summarized in Table 49. In terms of person-days of activity, the added activity could range from a low of just 35 person-days for a 10 increase in quality and a quality elasticity of 0.04 to a high of 39,307 additional person-days for a quality increase of 100 and a quality elasticity of 4.5. The estimated range of potential increases in income generated in the local county economies is between $3,126 and about $3.5 million. Consumer's surplus to nonconsumptive recreators is estimated to range from $1,261 to $1.4 million.

Table 46 Summary: Recreation Non-consumptive Activities - Alternative 2 - Economic Impact

	Additional State		Federal		Total: New Proposed		Existing State		Cumulative Total	
Person-days	493	1.2%	1,643	3.9%	2,136	5.1%	6,598	15.7%	8,735	20.8%
Market Impact										
Direct Sales	$ 80,237	1.1%	$ 275,149	3.9%	$ 355,386	5.0%	$ 1,130,945	15.9%	$ 1,486,331	20.9%
Direct Wages and Salaries	$ 29,222	1.1%	$ 100,127	3.9%	$ 129,349	5.0%	$ 411,290	15.9%	$ 540,639	20.9%
Direct Employment	1.9	1.1%	6.7	3.9%	8.6	4.9%	27.9	16.0%	36.5	21.0%
Total Income	$ 42,213	1.1%	$ 144,700	3.9%	$ 186,913	5.0%	$ 594,579	15.9%	$ 781,492	20.9%
Total Employment	2.2	1.1%	7.7	3.8%	9.9	5.0%	31.9	16.0%	41.7	21.0%
Non-Market Impact										
Consumer's Surplus	$ 17,799	1.2%	$ 59,312	3.9%	$ 77,111	5.1%	$ 238,166	15.7%	$ 315,277	20.8%
Profit1	$ 6,638	1.1%	$ 19,155	3.1%	$ 25,793	4.2%	$ 76,791	12.6%	$ 102,584	16.8%

1. Profit is used as a proxy for producer's surplus.

Table 47 Non-consumptive Recreation - Economic Impact - Alternative 2 (5.3-24)

	Whale Watching		NC Diving		Sailing		Kayaking/Sightseeing	
	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area	Boundary Alternative	% of Study Area
Additional State								
Person-days	260	1.00%	213	1.98%	20	0.49%	-	0.00%
Market Impact								
Direct Sales	$ 42,529	0.99%	$ 34,361	1.87%	$ 3,347	0.47%	$ -	0.00%
Direct Wages and Salaries	$ 15,487	0.99%	$ 12,517	1.87%	$ 1,218	0.47%	$ -	0.00%
Direct Employment	1.0	0.96%	0.8	1.77%	0.1	0.56%	-	0.00%
Total Income	$ 22,374	0.99%	$ 18,080	1.87%	$ 1,760	0.47%	$ -	0.00%
Total Employment	1.2	0.96%	1.0	1.84%	0.1	0.50%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 9,388	1.00%	$ 7,696	1.98%	$ 715	0.49%	$ -	0.00%
Profit1	$ 2,762	1.00%	$ 3,877	1.98%	$ 676	0.49%	$ -	0.00%
Federal								
Person-days	1,254	4.83%	321	2.98%	68	1.69%	-	0.00%
Market Impact								
Direct Sales	$ 205,505	4.79%	$ 57,653	3.13%	$ 11,991	1.69%	$ -	0.00%
Direct Wages and Salaries	$ 74,829	4.79%	$ 20,941	3.13%	$ 4,357	1.69%	$ -	0.00%
Direct Employment	5.0	4.80%	1.4	3.09%	0	1.69%	-	0.00%
Total Income	$ 108,106	4.79%	$ 30,293	3.13%	$ 6,302	1.69%	$ -	0.00%
Total Employment	5.7	4.78%	1.6	3.09%	0.4	1.73%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 45,274	4.83%	$ 11,588	2.98%	$ 2,450	1.69%	$ -	0.00%
Profit1	$ 13,318	4.83%	$ 5,837	2.98%	$ 2,318	1.69%	$ -	0.00%
Total New								
Person-days	1,514	5.83%	534	4.96%	88	2.18%	-	0.00%
Market Impact								
Direct Sales	$ 248,034	5.78%	$ 92,014	5.00%	$ 15,338	2.16%	$ -	0.00%
Direct Wages and Salaries	$ 90,316	5.79%	$ 33,458	5.00%	$ 5,575	2.16%	$ -	0.00%
Direct Employment	6	5.76%	2	4.86%	0	2.26%	-	0.00%
Total Income	$ 130,480	5.78%	$ 48,372	5.00%	$ 8,062	2.16%	$ -	0.00%
Total Employment	7	5.74%	3	4.93%	0	2.23%	-	0.00%
Non-Market Impact								
Consumer's Surplus	$ 54,662	5.83%	$ 19,283	4.96%	$ 3,165	2.18%	$ -	0.00%
Profit1	$ 16,079	5.83%	$ 9,714	4.96%	$ 2,995	2.18%	$ -	0.00%
Existing State								
Person-days	3,878	14.92%	1,959	18.18%	403	10.04%	358	29.07%
Market Impact								
Direct Sales	$ 644,785	15.04%	$ 342,379	18.60%	$ 68,922	9.69%	$ 74,859	29.07%
Direct Wages and Salaries	$ 234,683	15.03%	$ 124,448	18.59%	$ 25,066	9.70%	$ 27,093	29.07%
Direct Employment	16	15.07%	9	18.76%	1.7	9.60%	2.0	29.85%
Total Income	$ 339,123	15.03%	$ 179,956	18.60%	$ 36,236	9.69%	$ 39,265	29.07%
Total Employment	18.0	15.05%	10	18.74%	2.0	9.65%	2.3	29.61%
Non-Market Impact								
Consumer's Surplus	$ 139,971	14.92%	$ 70,708	18.18%	$ 14,549	10.04%	$ 12,938	29.07%
Profit1	$ 41,173	14.92%	$ 35,618	18.18%	$ 13,767	10.04%	$ 777	29.07%
Cumulative Total								
Person-days	5,392	20.75%	2,493	23.14%	491	12.22%	358	29.07%
Market Impact								
Direct Sales	$ 892,819	20.82%	$ 434,393	23.60%	$ 84,260	11.85%	$ 74,859	29.07%
Direct Wages and Salaries	$ 324,999	20.82%	$ 157,906	23.59%	$ 30,641	11.86%	$ 27,093	29.07%
Direct Employment	22	20.83%	11	23.62%	2	11.86%	2	29.85%
Total Income	$ 469,602	20.82%	$ 228,328	23.59%	$ 44,297	11.85%	$ 39,265	29.07%
Total Employment	25	20.80%	12	23.67%	2	11.88%	2	29.61%
Non-Market Impact								
Consumer's Surplus	$ 194,633	20.75%	$ 89,991	23.14%	$ 17,714	12.22%	$ 12,938	29.07%
Profit1	$ 57,252	20.75%	$ 45,332	23.14%	$ 16,762	12.22%	$ 777	29.07%

1. Profit is used as a proxy for producer's surplus.

Table 48 Potential Benefits to Non-consumptive Users from Alternative 2 Step 2 Analysis

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 308	$ 7,711	$ 34,700
	Income	$ 748	$ 18,691	$ 84,111
	Employment	0.039	0.99	4.43
	Person-days	9	214	961
50%				
	Consumer's Surplus	$ 1,542	$ 38,555	$ 173,499
	Income	$ 3,738	$ 93,457	$ 420,554
	Employment	0.197	4.93	22.16
	Person-days	43	1,068	4,807
100%				
	Consumer's Surplus	$ 3,084	$ 77,111	$ 346,997
	Income	$ 7,477	$ 186,913	$ 841,109
	Employment	0.394	9.85	44.33
	Person-days	85	2,136	9,614

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 2

Table 49 Potential Benefits to Non-consumptive Users from Alternative 2, Cumulative Step 2 Analysis

Increase in Quality	Economic Measure	Elasticity of 0.04	Elasticity of 1.0	Elasticity of 4.5
10%				
	Consumer's Surplus	$ 1,261	$ 31,528	$ 141,874
	Income	$ 3,126	$ 78,149	$ 351,671
	Employment	0.167	4.17	18.77
	Person-days	35	873	3,931
50%				
	Consumer's Surplus	$ 6,306	$ 157,638	$ 709,372
	Income	$ 15,630	$ 390,746	$ 1,758,356
	Employment	0.834	20.85	93.83
	Person-days	175	4,367	19,653
100%				
	Consumer's Surplus	$ 12,611	$ 315,277	$ 1,418,745
	Income	$ 31,260	$ 781,492	$ 3,516,712
	Employment	1.668	41.70	187.65
	Person-days	349	8,735	39,307

1. Benefits are the aggregate amounts across all non-consumptive activities for Alternative 2.

5.2.6 Other Potential Benefits and Net Assessment

A net assessment is provided using the National Net Benefits Approach. Under this approach, only consumer's surplus and economic rent[24] values are appropriate for consideration, as in a formal benefit-cost analysis. All the costs and benefits cannot be quantified, especially not across all alternatives, as with the nonuse or passive economic use values. But with certain assumptions designed to bias the result in favor of the consumptive activities, it can be shown that, except under the most conservative assumptions for the larger reserve alternatives, the nonuse or passive economic use values would likely exceed all consumptive use values. Thus, there would be net national benefits to adopting any of the alternatives in the CINMS.

[24] Economic Rent: A return on investment over and above a normal rate of return on investment. A normal rate of return on investment is that rate of return in which incentives are such that capital will neither outflow or inflow into the industry.

Table 50 Net Assessment - National Net Benefits of Marine Reserves in the CINMS

	Alternative 1	Alternative 2
Costs		
Recreation Consumptive	$2.96 million	$3.19 million
Commercial fisheries	$0	$0
Total Consumptive	$2.96 million	$3.19 million
Benefits		
Recreation Nonconsumptive		
Mid-range (50% Quality increase, elasticity 1.0)	$136,300	$157,600
Highest (100% Quality increase, elasticity 4.5)	$1.2 million	$1.4 million
Nonuse/Passive Economic Use Value		
1% of Households Willing to Pay		
Lowest ($3.12 million)	+	-
Mid-range ($5.19 million)	+	+
Highest ($10.39 million)	+	+
2% of Households Willing to Pay		
Lowest ($6.24 million)	+	+
Mid-range ($10.38 million)	+	+
Highest ($20.78 million)	+	+

Previous sections addressed the potential costs to all consumptive users (both the recreational industry and for the commercial fishery and kelp), and the potential benefits to recreational consumptive users and commercial fisheries from the replenishment effect of the marine reserves. Also discussed were the potential benefits to nonconsumptive recreational users and simulated the potential benefits using a range of assumptions about future quality increases in the marine reserves and the behavioral responses (quality elasticities). The concepts of nonuse or passive economic use values have been previously introduced. This section will conduct a policy analysis simulation. This is not a benefits transfer because there are no available studies in the literature on the passive economic use values of marine reserves anywhere in the world. This policy analysis simulation uses conservative assumptions about how many American households might be willing to pay for marine reserves in the CINMS. The policy analysis simulation is informed by using a conservative range of values from the economics literature on passive economic use value estimated for a variety of natural resources. Ranges of values are described as conservative meaning they will generate lower bound estimates of this potential value of marine reserves in the CINMS. Key national and California Statewide surveys are summarized to provide underlying support for the notion that people are willing to pay for marine reserves. Lastly, a rough assessment of the net national benefits of the marine reserves in the CINMS is provided. This is done by using maximum potential loss estimates for

consumptive uses, which have been shown in Step 2 analysis as generally overstating losses to consumptive uses, and comparing these with lower bound conservative estimates of the number of households willing to pay and the annual amounts they might be willing to pay. Although a range of values for nonconsumptive recreation is shown, they were not added to the Net Benefit Assessment.

It is not possible to provide an analysis by alternative; however, for passive economic use values to be considered valid, researchers usually apply a "scope test". The scope test checks to make sure that people's total willingness to pay for a good or service increases with the quantity and/or quality of the good or service being evaluated. It can be presumed that a larger marine reserve or a network of marine reserves that provides more resource protection will have higher passive economic use values than smaller marine reserves or a network of marine reserves that provides less resource protection.

An important conclusion of the policy analysis simulation and net benefits assessment is that, although estimates of the "actual value" of marine reserves cannot be calculated (lack of information), it is likely that any of the marine reserve alternatives considered here would yield net economic benefits. The gains to the Nation would be greater than the costs. The costs are the lost values from all current and future consumptive activities displaced from the marine reserves.

5.2.6.1 Nonuse or Passive Use Economic Value

As noted above, to date there are no known studies that have estimated nonuse or passive use economic values specifically for the marine reserves in the CINMS or for marine reserves anywhere else. However, Spurgeon (1992) has offered two sets of identifiable factors, which will dictate the magnitude of nonuse or passive use economic values. First, nonuse economic values will be positively related to the quality, condition, and uniqueness of the ecosystem on a national or global scale. Second, the size of population, standard of education, and environmental perception of people in the country owning or having jurisdiction over the ecosystem will be positively related to nonuse or passive use economic values. Thus, nonuse or passive use economic values are determined by both supply and demand conditions. The existence of many similar sites would reduce the value. Although Spurgeon limits his scope to the people in the country owning or having jurisdiction over the ecosystem, people from all over the world may have nonuse or passive use economic values for ecosystem protection in other countries. Debt for nature protection swaps being conducted by The Nature Conservancy in South America is just one example. Legitimacy of including the values of people from other countries is more a judicial concern than an economic one. In some judicial proceedings people from other countries might not have legal standing over issues of resource protection and their economic values may be eliminated from inclusion in the proceedings.

To find out what is known about nonuse economic values, a literature search was conducted and found 19 studies in which nonuse economic values were estimated. Desvouges et al. (1992)

contained summaries of 18 of the 19 studies. The remaining study was by Carson et al (1992) on the Exxon Valdez Oil Spill. Sixteen of the 18 studies found in Desvouges et al (1992) reported values (not adjusted for inflation) of $10 or more per household per year for a broad variety of natural resource protection efforts. Of the two studies that reported values less than $10/household/year, one reported $3.80/household/year for adding one park in Australia and $5.20/household per year for a second park (these estimates were from a National sample of Australians). The other study that estimated nonuse economic values less than $10/household/year was a study of Wisconsin residents willingness to pay for protecting bald eagles and striped shiners in the State of Wisconsin. For the bald eagle, nonuse economic values had an estimated range of $4.92 to $28.38/household/year, while for striped shiners the values ranged from $1.00 to $5.66/household/year. Total value ranged from $6.50 to $75.31/household/year.

Only two of the 18 studies summarized in Desvouges et al. (1992) used national samples of U.S. households; the others were limited to State or region populations. The Exxon Valdez Oil Spill Study (Carson et al. 1992) used a National sample of U.S. households. An important caveat is that the sample included only English speaking households and eliminated Alaskan residents. Alaskan residents were eliminated to limit the sample to primarily nonusers of Prince William Sound (site of the oil spill) and non-English speaking households were eliminated because the researchers were not able to convert their questionnaires to other languages. The impact was that the sample represented only 90% of U.S. households.

Carson et al. (1992) reported $31 per household as the median willingness to pay. The payment was a lump sum payment through income taxes and covered a ten-year period. The funds would go into a trust fund to pay for equipment and other costs necessary to prevent a future accident like the Exxon Valdez in Prince William Sound. After 10 years, double hull tankers would be fully implemented and the need for the protection program would expire. Mean willingness to pay was higher and more variable to model specification than the median willingness to pay, so the authors argued that the median value was a conservative estimate. Applying the $31/household to only 90 percent of the U.S. population of households was also considered conservative since non English speaking people probably have positive nonuse economic values as do Alaskans.

5.2.6.2 Estimation of Nonuse Economic Values

Given what is known about nonuse economic values, a range of "conservative" (i.e., lower bound) estimates of nonuse or passive use economic values for the marine reserves in the CINMS can be developed. To do this requires the following assumptions and facts:

Assumptions

1. 1% (1 to 2) of U.S. households would have some positive nonuse or passive economic use values for a network of marine reserves in the CINMS.

2. The 1% (1 to 2) of U.S. households would be, on average, willing to pay either $3/household/year, $5/household/year, or $10/houshold/year for marine reserves in the CINMS.

Fact:

1. As of July 1, 1999, there were 103.9 million households in the U.S.

Using the above assumptions and the number of U.S. households in 1999, a probable lower bound set of estimates for the nonuse or passive use economic values for the network of marine reserves in the CINMS can be calculated (Table 51).

Table 51 Estimate of Nonuse or Passive Economic Values

	$3/household/year	**$5/household/year**	**$10/household/year**
Annual Amount (1)	$3.12 million	$5.19 million	$10.39 million
Annual Amount (2)	$6.23 million	$10.39 million	$20.78 million

Under the assumption that 1 percent of U.S. households would be willing to pay some amount, the annual willingness to pay for marine reserves in the CINMS would range between $3.12 million and $10.39 million, depending on the assumed willingness to pay per household. Under the assumption that 2 percent of U.S. households would be willing to pay some amount, the annual willingness to pay for marine reserves in the CINMS would range between $6.23 million and $20.78 million. It is expected that nonuse economic values would be greater the larger the area protected. But as described earlier, it would also be expected that willingness to pay to be positively related to both the characteristics of those valuing the reserve and the characteristics of what they are asked to value. Since the estimates of nonuse economic values are based on an assumed range of values (at the lowest end of the distribution of values estimated in other studies), it is not possible to compare the values of the different alternatives in dollar terms. However, following the suggestions of Spurgeon, it can be demonstrated that the characteristics of the U.S. population would support the Statement that the above estimates would likely be lower bound estimates.

5.2.6.3 Scientific and Education Values

Marine reserves provide a multitude of benefits. Sobel (1996) provides a long list of these benefits. Most of those benefits have been covered in Chapters 1 and 2 and in the discussion of nonuse economic benefits above. Scientific and education values were categorized by Sobel into those things a reserve provides that increase knowledge and understanding of marine systems. Sobel provides the following lists of benefits:

Scientific

- Provides long-term monitoring sites
- Provides focus for study
- Provides continuity of knowledge in undisturbed site
- Provides opportunity to restore or maintain natural behaviors
- Reduces risks to long-term experiments
- Provides controlled natural areas for assessing anthropogenic impacts, including fishing and other impacts

Education

- Provides sites for enhanced primary and adult education
- Provides sites for high-level graduate education
- These benefits cannot be quantified, but they are extremely important.

5.2.6.4 Vessel Use Analysis of Alternatives

SAMSAP

The Sanctuary Aerial Monitoring and Spatial Analysis program (SAMSAP) is used to analyze vessel use of each alternative and characterize potential congestion. SAMSAP is designed to monitor and analyze the physical and anthropogenic phenomena within the Sanctuary such as Sanctuary users, commercial and recreational vessel traffic, using a GIS and aerial GPS collection strategy.

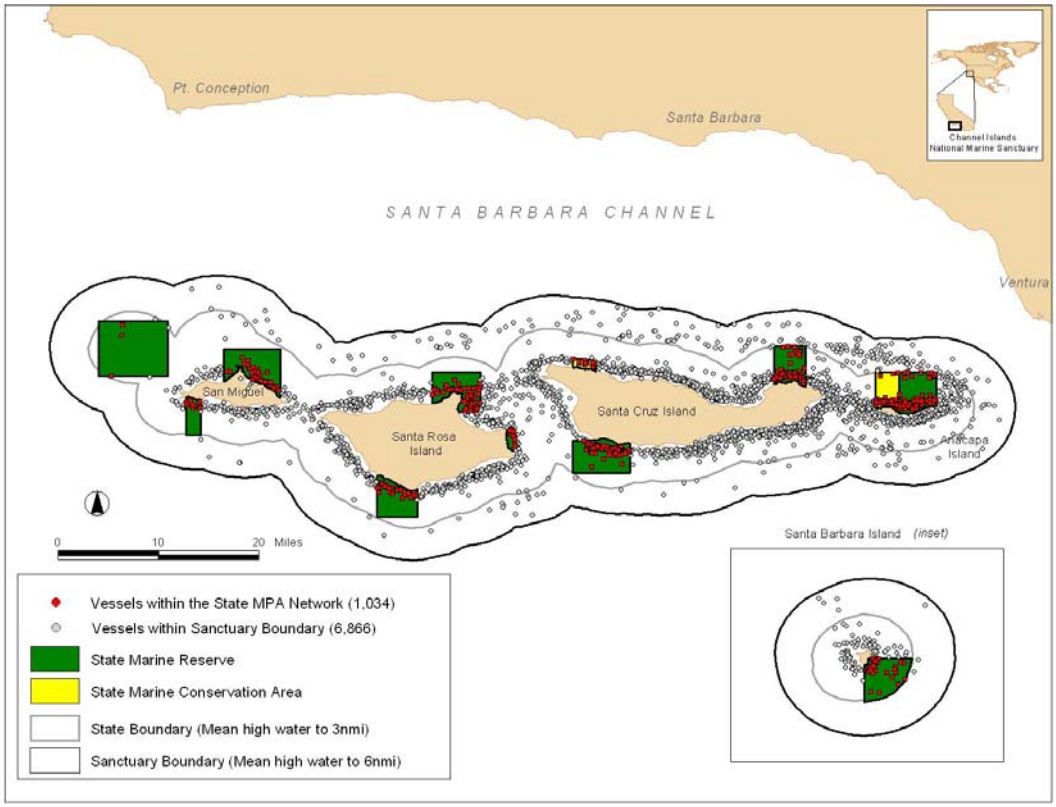
Surveys of vessel traffic and vessel type allow anthropogenic use patterns to be studied, e.g., displacement of fishing effort due to marine reserves. Data downloaded into the Sanctuary's GIS are used to analyze historical trends and detect correlations across data types.

The following anthropogenic use analysis utilizes vessel sightings to examine human use within CINMS and the potential impact of the NEPA alternatives. The sightings span between July 1997 and August 2004. Vessel types are classified into four categories: (1) consumptive, commercial (2) consumptive, recreational (3) nonconsumptive, commercial (4) non-consumptive, recreational.

Vessels Within CINMS

Figure 14 shows the distribution of nonconsumptive and consumptive vessels within CINMS regions. The majority of vessels were observed within CINMS' State waters as compared to CINMS' Federal waters. Of the 7,094 total observed vessels during the period of 1997-2004, 91.4% were observed in State waters and 5.4% were observed within CINMS Federal waters, and 3.2% were observed outside of the CINMS boundary.

Figure 14 Vessels within CINMS, 1997 – 2004

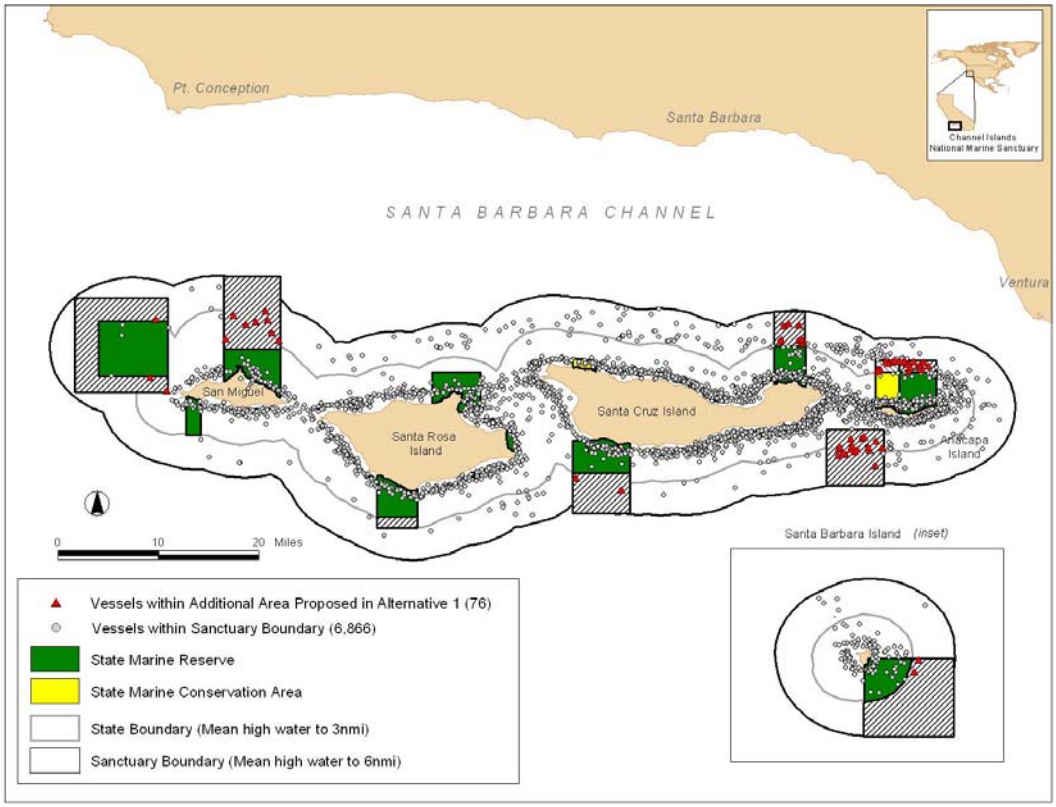


The spatial distribution of vessel sightings shows that 1,034 of sightings occurred within the existing State MPA network, comprising 15.1% of all observations made within CINMS State and Federal waters (Figure 14).

5.2.6.5 Activity In The Proposed Alternatives

Of the 6,866 vessels observed within the sanctuary, 76 were sighted within the Federal waters of Alternative 1; and 128 vessels were sighted within the Federal waters of Alternative 2. Figure 15 demonstrates the number of vessels sighted within Alternative 1.

Figure 15 Vessels within Alternative 1



5.3 Management Considerations

The following section describes considerations for managing the proposed network of marine zones under each of the four alternatives. Because the ecological and socioeconomic impacts associated with Alternatives 1a, 1b, and 1c are either identical or very similar, management considerations must be taken into account as an important factor in describing the different impacts among these alternatives. These considerations are summarized in Table 52.

5.3.1 Alternative 1a (Preferred Alternative)

In Alternative 1a, the boundaries of the proposed marine zones (and their corresponding regulations) would completely overlay the existing State marine zone boundaries and extend beyond into Federal waters and terminate at the mean high water line of the Channel Islands.

In this scenario, NOAA regulations (under the NMSA) would fully complement existing State regulations in the State waters of the marine zone network. To date, NOAA has invested over two million dollars in implementing the community, State and Federal phases of the marine zoning process at CINMS, and in the monitoring, education, outreach, and enforcement of the existing zones.[25] This fully complementary approach would engage NOAA in maintaining such management efforts, thereby reducing the burden of managing the marine zones on the State, especially in the areas discussed below.

5.3.1.1 Enforcement

State and Federal law enforcement personnel recommend seamless and consistent marine zoning regulations for two principal reasons:

- Zone boundaries that are on straight lines of latitude and longitude are easier to enforce (the existing and proposed marine zone boundaries are on the nearest whole minute and straight lines of latitude and longitude).
- Seamless and consistent marine zoning regulations between State and Federal waters enhance the public's understanding of the regulations and are easier to enforce (the proposed NMSA regulations are drafted to be consistent with the FGC regulations for Marine Protected Areas; NMSA regulations in State waters are also consistent with NMFS EFH boundaries, which extend from mean high water to the outer boundary of the proposed marine zones in Alternative 1a).

[25] Examples of outreach products include: a Marine Protected Area Brochure, a Boating and Safety Brochure, "Protecting Your Channel Islands" brochure (provided to the State for distribution by CDFG wardens to users in the Sanctuary), Mapping and Ocean Sanctuary GIS Curriculum, "Recreation in the Sanctuary" (Alolkoy, Winter 2002), "Marine Reserves: Where Do You Fit In?" digital lab, and the poster "Wild for the Future", which targets K-12 students.

Alternative 1a meets both of these criteria. Additional enforcement considerations for Alternative 1a include:

- Section 307 of the NMSA provides civil penalty authority for NOAA for any violation of an applicable Sanctuary regulation or permit. (The only criminal offense is interference with law enforcement officers.)
- The current maximum penalty is $130,000 per violation per day. While this is the maximum, the more typical civil penalty range is $5,000-20,000, depending on the type and nature of the violation.
- A Summary Settlement schedule can be developed to enable smaller "on-the-spot" penalties for minor infractions.
- Where the Sanctuary boundaries overlap with State waters, both Federal and State statutes can be enforced. NOAA and the State have executed a memorandum of understanding regarding the application of NOAA's civil penalty authority. The NMSP has invested nearly $80,000 over the last two years toward cooperative enforcement of existing Sanctuary regulations.
- CINMS has partnerships with other Federal and State law enforcement agencies (e.g., the US Coast Guard, CINP and CDFG) that enable more effective Sanctuary enforcement. NOAA has a cooperative agreement with the State of California for cross-deputizing the State's officers to enforce the NMSA.
- Section 307(j) of the NMSA provides authority for NOAA to seek injunctive relief in cases where it is determined that there is injury, or imminent risk of injury, to a Sanctuary resource.
- The civil penalty funds are deposited into a separate account for the sanctuary in which the violation occurred. The funds are intended for the use of that specific sanctuary for further resource protection efforts, at the discretion of the manager.

5.3.1.2 Research and Monitoring

Complementary regulations would strengthen NOAA's justification for funding and supporting monitoring efforts. To date the Sanctuary has invested approximately $500,000 annually on reserves monitoring.

5.3.1.3 Education and Outreach

Complementary regulations would strengthen NOAA's justification for funding and supporting education and outreach efforts. To date, the State has relied on the NMSP to develop education and outreach products.

5.3.1.4 Community Involvement

To date, the CINMS Advisory Council has served as the focal point for the consideration, development and implementation of the Channel Islands marine zoning network (see Appendix

D: Meeting History). The Advisory Council meets every two months and provides a rapid advisory response to management issues. The Advisory Council meetings are open to the public and include membership from a wide variety of community interests.[26] The Advisory Council has an established a Research Activities Panel (RAP) of scientific advisors who provide additional input and advice on research activities at the Channel Islands and have taken on MPA monitoring review as a specific task. The Advisory Council also has working groups to provide additional input and advice to the Sanctuary manager. NOAA and the CDFG believe the CINMS Advisory Council is a robust mechanism for effective community input to management of the marine zoning network. Under Alternative 1a, the CINMS Advisory Council could serve as a single representative body for providing management advice on the entire network of marine zones. Under Alternatives 1b and 1c, the CDFG might need to create a new steering committee to provide management advice for the State waters portions of the network. This would result in an additional public meeting that could easily confuse the public, would require redundant administrative costs of hosting the meetings, and could result in competition and conflicts for representatives to sit on the respective advisory committees.

5.3.1.5 Administrative Requirements

In addition to diminishing the burden of the management issues identified above, implementing Alternative 1a would likely either eliminate or significantly reduce the urgency for a State administrative process to complete the spatial and regulatory gaps in protection between the outer boundary of the existing State zones and the proposed Federal waters zones. Completing the network in State and Federal waters would leave no gap in protection between State and Federal waters.

5.3.2 Alternative 1b

In Alternative 1b, the boundaries of the proposed marine zones (and their corresponding regulations) would abut the existing State marine zone boundaries, thereby including a small portion of State waters. Under this scenario, NMSP regulations would apply only within small portions of State waters beyond the existing State marine zones.

In general, NOAA's obligations for monitoring, education and outreach would be diminished in the nearshore zones under Alternative 1b. In addition, the Federal enforcement benefits listed above would not apply in the existing State marine zones.

Under Alternative 1b, the CDFG might need to create a new steering committee to provide management advice for the State waters portions of the network. This would result in an additional public meeting that could easily confuse the public, would require redundant

[26] Advisory Council membership includes the same sorts of members originally suggested by the CDFG for Channel Islands Marine Protected Area Monitoring Plan steering committee.

administrative costs of hosting the meetings, and could result in competition and conflicts for representatives to sit on the respective advisory committees.

Further, under Alternative 1b, the Federal protection offered to the entire zone network by the combination of NMSA and MSA regulations under Alternative 1a would be reduced to only the groundfish protections put forward under the MSA in Federal waters. As such, under Alternative 1b, the State waters beyond the existing State marine zones of the proposed zones would not be protected.

5.3.3 Alternative 1c

In Alternative 1c, the boundaries of the proposed marine zones would terminate at the existing State-Federal waters boundary (3 nmi from shore). Because most of the existing State marine zones do not come all the way to State-Federal waters boundary, Alternative 1c would result in small gaps of unprotected waters between most of the proposed Federal marine zones and the existing State marine zones.

Under this scenario, no new NMSP regulations would apply within State waters of the Sanctuary. In general, NOAA's obligations to monitoring, education and outreach would be diminished relative to Alternatives 1a and 1b in the nearshore zones under Alternative 1c. In addition, the Federal enforcement benefits listed above would not apply in the existing State marine zones.

Under Alternative 1c, the CDFG might need to create a new steering committee to provide management advice for the State waters portions of the network. This would result in an additional public meeting that could easily confuse the public, would require redundant administrative costs of hosting the meetings, and could result in competition and conflicts for representatives to sit on the respective advisory councils/committees.

Finally, to complete the marine zoning network and avoid gaps in protection, the State would need to take administrative action to extend the protection from the existing State marine zones to the Federal water boundary at three nmi. This step would likely add an administrative burden and time delay to an already costly and on-going process to establish marine zones in CINMS. Further delay and costs in promulgating regulations diminishes both the State and Federal agencies' ability to dedicate resources to monitoring, enforcement and outreach. This scenario also creates additional burdens on enforcement and public confusion until the gaps in protection are addressed.

5.3.4 Alternative 2

In Alternative 2, the boundaries of the proposed marine zones (and their corresponding regulations) would completely overlay the existing State marine zone boundaries and extend beyond into Federal waters and terminate at the mean high water line of the Channel Islands.

In this scenario, NOAA regulations (under the NMSA) would fully complement existing State regulations in the State waters of the marine zone network. To date, NOAA has invested over two million dollars in implementing the community, State and Federal phases of the marine zoning process at CINMS, and in the monitoring, education, outreach, and enforcement of the existing zones. This fully complementary approach would engage NOAA in maintaining such management efforts, thereby reducing the burden of managing the marine zones on the State, especially in enforcement, community involvement, monitoring, education and outreach; see section 5.3.1.

Table 52 Management Considerations for the Four Alternatives

	Alt. 1a	Alt. 1b	Alt. 1c
No need for State regulatory action to complete original proposal (no "gap")	X	X	
MPA boundaries are straight lines (easier to enforce)	X	X	
Consistent with NMFS EFH boundaries	X		
Consistent with scientific recommendations for contiguous protection	X	X	
Allows prosecution under Federal law in all areas (high civil penalties, dedicated account, easier to prosecute because civil not criminal)	X		X
State must take action to complete original proposal (gap in area)			X
Boundaries difficult to understand			X
Inconsistent with EFH designation		X	X

6.0 LIST OF PREPARERS

Chris Mobley, NOAA, Sanctuary Superintendent, Channel Islands National Marine Sanctuary
B.A., Biology, Dartmouth College
M.S., Oceanography, University of Washington
M.B.A., Sonoma State University
Years of Experience: 19

Sean Hastings, NOAA, Resource Protection Coordinator, Channel Islands National Marine Sanctuary
B.A. 1992, Environmental Studies, University of California, Santa Cruz
M.M.A., 1997, Marine Policy, University of Washington
Years of Experience: 9

Satie Airame, NOAA, Scientific Advisor, Channel Islands National Marine Sanctuary
B.S, 1993, Biology, Humboldt State University
M.S., 1996, Evolutionary Biology, University of Chicago
Ph.D., 1999, Evolutionary Biology, University of Chicago
Years of Experience: 7

Natalie Senyk, NOAA, Scientific Advisor, Channel Islands National Marine Sanctuary
B.S., 2000, Environmental Science, Rutgers University
M.S., 2006 Marine Science, University of California, Santa Barbara
Years of Experience: 5

Bob Leeworthy, NOAA, Leader, Coastal and Ocean Resource Economics Program
B.S. 1975, Economics, Florida State University
M.S., 1984 Economics, Florida State University
Ph.D., 1990, Economics, Florida State University
Years of Experience: 30

Peter Wiley, NOAA, Economist, Coastal and Ocean Resource Economics Program
B.A., 1986, Economics, St. Mary's College of Maryland
M.A., 1999, Economics, The George Washington University
Years of Experience: 16

Jordan Parrillo, NOAA, Economist, National Marine Sanctuary Program
B.A., 2004, Economics and Environmental Science, Colorado College
Years of Experience: 2

Rod Ehler, NOAA, Economist, National Marine Sanctuary Program
B.S, 1990, Economics, Virginia Tech
M.S., 1997, Environmental Science and Policy, Johns Hopkins University
Years of Experience: 16

Matt Brookhart, NOAA, Policy Coordinator, West Coast Region, National Marine Sanctuary Program
B.A., 1993, History, Seattle University
M.A., 1996, Asian Studies (Environmental Policy), University of Oregon
M.A., 1999, Environmental Policy, Monterey Institute of International Studies

Years of Experience: 7

John Armor, NOAA, Legislative, Regulatory, & NEPA Coordinator, National Marine Sanctuary Program
B.S., 1997, Marine Science, University of South Carolina
M.S., 2006, Environmental Science and Policy, Johns Hopkins University
Years of Experience: 6

Christina McGinnis, Bioregional Planning Associates, Principal Planner
B.A., 1991, History, University of California, Los Angeles (UCLA)
M.U.P., 1994, Urban and Regional Planning, Emphasis in Environmental and Land Use Planning, University of Oregon
Years of Experience: 16

Michael V. McGinnis, Bioregional Planning Associates, Principal Policy Analyst
B.A., 1985, Political Science, University of California, Los Angeles
M.A., 1988, Political Science, University of California, Santa Barbara
Ph.D., 1993, Political Science, University of California, Santa Barbara
Years of Experience: 13

7.0 LIST OF ACRONYMS

AA	National Oceanic and Atmospheric Administration
CCA	Cowcod Conservation Area
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CINMS	Channel Islands National Marine Sanctuary
CINP	Channel Islands National Park
CMAR	Coastal Maritime Archaeology Resources
CODAR	Coastal Ocean Dynamics Applications Radar
CPFVs	Commercial Passenger Fishing Vessels
DEIS	Draft Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report (State)
EIS	Environmental Impact Statement (Federal)
ESA	Endangered Species Act
FGC	California Fish and Game Commission
FMP	Fishery Management Plan
ITQ	Individual Transferable Quota
LTER	Long-Term Ecological Research
MCA	Marine Conservation Areas
MERRP	Marine Ecological Reserves Research Program
MLMA	Marine Life Management Act (CA)
MLPA	Marine Life Protection Act (CA)
MMPA	Marine Mammal Protection Act of 1972
MPA	Marine Protected Area
MR	Marine Reserve
MRWG	Marine Reserve Working Group
NCCOS	National Centers for Coastal Ocean Science
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NMFS	National Marine Fisheries Service
nmi	Nautical Mile
NMSA	National Marine Sanctuaries Act
NMSP	National Marine Sanctuary Program
NMSP	National Marine Sanctuaries Program
CalCOFI	California Cooperative Oceanic Fisheries Investigations
PFMC	Pacific Fisheries Management Council
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
RUMs	Random Utility Models
SAC	Sanctuary Advisory Council
SAMSAP	Sanctuary Aerial Monitoring and Spatial Analysis Program
SAP	Science Advisory Panel
SAT	Science Advisory Team
SCB	Southern California Bight
SMCA	State Marine Conservation Area
SMR	State Marine Reserve
UCSB	University of California, Santa Barbara
USCG	US Coast Guard

8.0 REFERENCES

Abbott, I.A. and G.J. Hollenberg. 1976. Marine Algae of California. Stanford University Press, Stanford, CA.

Adams 2003: Adams, J., J. Y. Takekawa, H. R. Carter. 2004. Foraging distance and home range of Cassin's Auklets nesting at two colonies in the California Channel Islands. The Condor 106(3).

Ainley, D.G., W. J. Sydeman, and J. Norton. 1995. Upper trophic level predators indicate interannual negative and positive anomalies in the California Current food web. Mar. Ecol. Prog. Series 118: 69-79.

Airame, S., J. E. Dugan, K. D. Lafferty, H. Leslie, D. A. McArdle, and R. R. Warner. 2003. Applying ecological criteria to marine reserve design: a case study from the Channel Islands. Ecological Applications 13: S170 – S184.

Airame, S. 2000. Species of Interest in the Channel Islands. Channel Islands National Marine Sanctuary, Santa Barbara, CA

Allison, G.W., Gaines, S.D., Lubchenco, J., and Possingham, H.P. 2003. Measuring persistence of marine reserves: catastrophes require adopting an insurance factor. Ecological Applications 13: 8.

Apostolakis, G. 1990. The Concept of Probability in Safety Assessments of Technological Systems. Science 250: 1359-1364.

Babcock, E.A. and E.K. Pikitch. 2004. Can we reach agreement on a standardized approach to ecosystem-based fishery management? Bulletin of Marine Science 74, 3: 685-692.

Baird, P.H. 1990. Concentrations of seabirds at oil-drilling rigs. Condor. 92(3):768-771. California Department of Fish and Game [CDFG]. 2002. Marine Protected Areas in NOAA's Channel Islands National Marine Sanctuary. Final Environmental Document. Vol. I and II. Sacramento, CA.

Beamish, R.J., Noakes D.J., McFarlane G.A., Klyashtorin L., Ivanov V.V., Kurashov V. 1999. The regime concept and natural trends in the production of Pacific salmon. Can J Fish Aquat Sci 56:516-526

Behrens, M. D., and K. D. Lafferty 2004. Effects of marine reserves and urchin disease on southern California rocky reef communities. Marine Ecology Progress Series. 279: 129-139.

Bell, Frederick W., Bonn, Mark A. and Leeworthy, Vernon R. 1998. Economic Impact and Importance of Artificial Reefs in Northwest Florida. Florida State University,

Department of Economics and Department of Hospitality Services, Tallahassee, Florida and National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects Office, Silver Spring, Maryland. Under contract to Office of Fisheries Management and Assistance Service, Florida Department of Environmental Protection, contract Number MR235. Tallahassee, FL, December 1998.

Béné and Tewfik 2003. Biological evaluation of marine protected area: evidence of crowding effect on a protected population of queen conch in the Caribbean. Marine Ecology. 24(1): 45-58.

Benson, A.J. and A.W. Trites. 2002. Ecological effects of regime shifts in the Bering Sea and eastern North Pacific. Fish and Fisheries 3: 95-113.

Bograd, S.J., P. M. Digiacomo, R. Durazo, T. L. Hayward, K. D. Hyrenbach, R. J. Lynn, A. W. Mantyla, F. B. Schwing, W. J. Sydeman, T. Baumgartner, B. Lavaniegos, C. S. Moore. 2000. The State of the California Current, 1999-2000: Forward to a New Regime? CalCOFI Report 41: 26-52.

Butler, J.L., Smith, P.E. and Lo, N.C.-H. 1993. The effect of natural variability of life-history parameters on anchovy and sardine population growth. CalCOFI Rep. 34:104-11.

California Department of Fish and Game (CDFG 2002). Final 2002 Environmental Document. Marine Protected Areas in the National Oceanic and Atmospheric Administration's Channel Islands National Marine Sanctuary. Volume I and II. October. http://www.dfg.ca.gov/mrd/ci_ceqa/index.html

California Department of Fish and Game. 2005. California Marine Life Protection Act Initiative. Draft Master Plan Framework. A Recommendation to the California Fish and Game Commission by the California Department of Fish & Game. August 18, 2005. http://www.dfg.ca.gov/mrd/mlpa/pdfs/mpf0805_clean.pdf

California Resources Agency. 2001. Southern California Wetland Recover Project. Regional Plan. San Francisco, California. November.

Cannariato, K.G., and J.P. Kennett. 1999. Climatically related millennial-scale fluctuations in strength of California margin oxygen-minimum zone during the past 60 k.y. Geology 27, (11): 975-978.

Cannariato, K.G., J.P. Kennett, and R.J. Behl. 1999. Biotic response to late Quaternary rapid climate switches in Santa Barbara Basin: Ecological and Evolutionary implications. Geology 27, 1: 63-66.

Carr, M.H. 1989. Effects of macroalgal assemblages on the recruitment of temperate reef fishes. Jour. Exp. Mar. Biol. Ecol. 126:59-76.

Carr, M.H., M.V. McGinnis, G. Forrester, J. Harding, and P. Raimondi. 2004. Consequences of Alternative Decommissioning Options to Reef Fish Assemblages and Implications for Decommissioning Policy. 2004. Published by the Mineral Management Service. Pacific Region. U.S. Department of the Interior. MMS Cooperative Agreement No. 14-35-0001-30758. 140pp. http://santacruz.nmfs.noaa.gov/files/pubs/00711.pdf

Carson, Richard T., Mitchell, Robert C., Hanemann, W. Michael, Kopp, Raymond J., Presser, Stanley, and Ruud, Paul A. 1992. A Contingent Valuation Study of Lost Passive Use Values Resulting from the Exxon Valdez Oil Spill. A report to the Attorney General of the State of Alaska. November 10, 1992.

Caselle, personal communication. (Jenn Caselle, Marine Science Institute, UCSB, PISCO monitoring program, January 2005).

Caselle, unpublished data: Jenn Caselle, Marine Science Institute, UCSB, PISCO monitoring program.

Chelton, D.B., P.A. Bernal, and J.A. McGowan. 1982. Large-scale Interannual Physical and Biological Interaction in the California Current. J. Mar. Res. 40(4):1095B1125.

Cote, I. M., I. Mosqueira, and J. D. Reynolds. 2001. Effects of marine reserve characteristics on the protection of fish populations: a meta-analysis. Journal of Fish Biology. 59(Supplement A): 178-189.

Cross, J.N. and L.G. Allen. 1993. Fishes. In Ecology of the Southern California Bight: a synthesis and interpretation, M.D. Dailey, D. J. Reish, and J.W. Anderson, eds. University of California Press, Berkeley, pp. 459-540.

Dailey, M.D., D. J. Reish, and J.W. Anderson. 1993. Ecology of the Southern California Bight. University of California Press, Berkeley, California, USA.

Dawson, M.N. 2001. Phylogeography in coastal marine animals: a solution from California? Journal of Biogeography 28: 723-736.

Dayton, P. K., S. Thrush, and F. C. Coleman. 2002. The Ecological Effects of Fishing in Marine Ecosystems of the United States. Pew Oceans Commission, Arlington, VA (52 pp).

Dayton, P.K., M.J. Tegner, P.E. Parnell, and P.B. Edwards. 1992. Temporal and Spatial Patterns of Disturbance and Recovery in a Kelp Forest Community. Ecol. Monogr. 62: 421-445.

den Hartog, C. 1970. The Sea-Grasses of the World. North Holland Pub. Co., Amsterdam, The Netherlands.

Desvouges, William H., Johnson, F. Reed, Dunford, Richard W., Boyle, Kevin J., Hudson, Sara P. and Wilson, Nicole K. 1992. Measuring Nonuse Damages Using Contingent

Valuation: An Experimental Evaluation of Accuracy. Research Triangle Institute Monograph 92-1. Exxon Corporation.

Di Lorenzo, E., A. J. Miller, N. Schneider, and J. C. McWilliams. 2005. The Warming of the California Current System: Dynamics and Ecosystem Implications. Journal of Physical Oceanography. 35: 336-362.

Dugan, J.E. and G.E. Davis. 1993. Applications of marine refugia to coastal fisheries management. Canadian Journal of Fisheries and Aquatic Sciences. 50:2029-2042.

Ecosystem Principles Advisory Panel. 1998. Ecosystem-based Fishery Management. Congressional Report. Page 53. Engle, J. M. Tatman Foundation, Marine Science Institute, University of California, Santa Barbara, CA. Unpublished Data.

Endangered Seas Campaign. Washington, DC and Environment Department, University of York, York YO10 5DD, UK.

Fiedler, P.C. 2002. Environmental change in the eastern tropical Pacific Ocean: review of ENSO and decadal variability. Mar Ecol Prog Ser.: 244: 265-283.

Fisher, J.D. and K. T. Frank. 2002. Changes in finfish community structure associated with an offshore fishery closed area on the Scotian Shelf. Marine Ecology Progress Series. 240: 249-265.

Fluharty, D. and N. Cyr. 2001. Implementing Ecosystem-based Management of Fisheries in the Context of U.S. Regional Fisheries Management: Recommendations of the NMFS Ecosystem Principles Advisory Panel. CalCOFI Report 42: 66-73.

Francis R.C., Hare S.R., Hollowed A.B., Wooster W.S. 1998. Effects of interdecadal climate variability on the oceanic ecosystems of the NE Pacific. Fish Oceanogr 7

Francis, R.C. and S.R. Hare. 1994. Decadal-scale regime shifts in the large marine ecosystems of the North-east Pacific: a case for historical science. Fish. Oceanogr. 3(4): 279-291.

Freeman III, A. Myrick (1995). "The Benefits of Water Quality Improvements for Marine Recreation : A Review of the Empirical Evidence." Marine Resource Economics. Volume 10. pp. 385-406.

Gentner, Brad, Price, Michael and Steinback, Scott. 2001. Marine Angler Expenditures in the Pacific Coast region, 2000. NOAA Technical Memorandum NMFS-F/SPO-49, November 2001. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, Maryland.

Gentner, Brad, Price, Michael and Steinback, Scott. 2001. Marine Angler Expenditures in the Pacific Coast region, 2000. NOAA Technical Memorandum NMFS-F/SPO-49,

November 2001. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, Maryland.

Gerber, L. R., K. D. Hyrenbach, and M. A. Zacharias. 2005. Do the largest protected areas conserve whales or whalers? Science. 307: 525-526.

Goodman, D., M. Mangel, G. Parkes, T. Quinn, V. Restrepo, T. Smith, K. Stokes, and G. Thompson. 2002. Scientific Review of the Harvest Strategy Currently Used in the BSAI and GOA Groundfish Fishery Management Plans. Prepared for North Pacific Fishery Management Council. November 21. http://www.fakr.noaa.gov/npfmc/misc_pub/f40review1102.pdf

Halpern, B. 2003. The impact of marine reserves: Do reserves work and does reserve size matter? Ecological Applications Supplement 13(1): 117-137.

Halpin, P.M., P.T. Strub, W.T. Peterson, T.R. Baumgartner. 2004. An overview of interactions among oceanography, marine ecosystems, climatic and human disruptions along the eastern margins of the Pacific Ocean. Revista Chilena de Historia Natural, 77:371-409.

Hanemann, W.M., Wegge, T.C. and Strand I.E. 1991. Development and Application of a Predictive Model to Analyze the Economic Effects of Species Availability. National Marine Fisheries Service, Southwest Region. Administrative Report SWR-89-02. Terminal Island, California.

Hardy, J.T. 1993. Phytoplankton. In Ecology of the Southern California Bight: A Synthesis and Interpretation, M.D. Dailey, D.J. Reish, and J.W. Anderson, eds. Berkeley, CA: University of California Press, pp. 233-265.

Harms, S. and Winant, C.D. 1998. Characteristic patterns of the circulation in the Santa Barbara Channel. Journal of Geophysical Research 103 (C2): 3041-3065.

Hayward, T.L. 2000. El Nino 1997-98 in the Coastal Waters of Southern California: A timeline of events. CalCOFI 41:98-116.

Hayward, T.L., S.L. Cummings, D.R. Cayan, F.P. Chavez, R.J. Lynn, A.W. Mantyla, P.P. Niiler, F.B. Schwing, R.R. Veit, and E.L. Venrick. 1996. The State of the California Current in 1995-1996: Continuing declines in macrozooplankton biomass during a period of nearly normal circulation. Calif. Coop. Oceanic. Fish. Invest. Rep. 37:22-37.

Helvey, M. 2005. Seeking consensus on designing marine protected areas: keeping the fishing community engaged. Coastal Management 32: 173.

Heyman, W.D. 2004. Conservation of multi-species spawning aggregation sites. Proceedings of the Gulf and Caribbean Fisheries Institute. 55: 521-529.

Hooker, S. K., and L. R. Gerber. 2004. Marine reserves as a tool for ecosystem-based management: the potential importance of megafauna. BioScience. 54(1): 27-39.

Horn, M. H. and L. G. Allen. 1978. A distributional analysis of California coastal marine fishes. Journal of Biogeography. 5:23-42.

Hyrenback, K.D. and R.R. Viet. 1999. Response of seabird abundance to long-term changes in the California Current, 1987-1998. Pac. Seabirds 26(1): 25.

Jackson, J.B.C., M. X. Kirby, w. H. Berger, K. A. Bjorndal, l. w. Botsford, B. j. Bourque, R. H. Bradbury, R. Cooke, j. Erlandson, J. A. Estes, T. P. Hughes, S. Kidwell, C. b. Lange, H. S. Lenihan, J. M. Pandolfi, C. H. Peterson, R. S. Steneck, M. J. Tegner, and R. R. Warner. 2001. Historical Overfishing and the Recent Collapse of Coastal Ecosystems. Science 293. 27 July: 629-637.

Kennett, J.P. and Ingram, B.L. 1995. A 20,000 year record of ocean circulation and climate change from the Santa Barbara Basin. Nature 377: 510-514.

Kinlan BP, and Gaines SD. 2003. Propagule dispersal in marine and terrestrial environments: a community perspective. Ecology 84: 2007 -2020.

Kushner unpublished data: David Kushner, Channel Islands National Park Kelp Forest Monitoring Program database.

Lafferty, K. D, and M. D. Behrens. 2005. Temporal variation in the State of rocky reefs: does fishing increase the vulnerability of kelp forests to disturbance? Proceedings of the Sixth California Islands Symposium, Ventura, CA, Institute for Wildlife Studies. Pgs. 511-520.

Larkin N.K., and Harrison D.E. 2001. Tropical Pacific ENSO cold events, 1946"95: SST, SLP, and surface wind composite anomalies. J Clim 14:3904-3931

Leatherwood, S., B. Stewart and P. Folkens. 1987. Cetaceans of the Channel Islands National Marine Sanctuary. Channel Islands National Marine Sanctuary, NOAA and the National Marine Fisheries Service.

Leatherwood, S., R. Reeves, W. Perrin, and W. Evans. 1982. Whales, Dolphins and Porpoises of the Eastern North Pacific and Adjacent Arctic Waters. NOAA Technical Report, National Marine Fisheries Service Circular 444.

Leet, W. S., C.M. Dewees, R. Klingbeil, and E.J. Larson, (eds.) 2001. California=s Living Marine Resources: A Status Report. The Resources Agency, California Department of Fish and Game. 592 pp.

Leeworthy, V.R., and P.C. Wiley (Leeworth and Wiley 2003). Socioeconomic Impact Analysis of Marine Reserve Alternatives for the Channel Islands National Marine Sanctuary. National Oceanic and Atmospheric Administration, National Ocean Service, Special

Projects, Silver Spring, Maryland. April 8.Lehman, P.E. 1994. The birds of Santa Barbara County, California. Santa Barbara Vertebrate Museum, University of California.

Leeworthy, Vernon R. and Wiley, Peter C. 2001 c. Current Patterns of Participation in Marine Recreation. National Survey on Recreation and the Environment (NSRE) 2000. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects Office, Silver Spring, Maryland. November 20, 2001.

Leeworthy, Vernon R. and Wiley, Peter C. 2005. Socioeconomic Impact Analysis of Marine Reserves for the Channel Islands National Marine Sanctuary. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, Special Projects, Silver Spring, Maryland, May 2005.

Love, M.S., J.E. Caselle, and W.Van Buskirk. 1998. A Severe Decline in the Commercial Passengers Fishing Vessel Rockfish (Sebastes sp.) Catch in the Southern California Bight, 1980 - 1996. Calif. Coop. Oceanic Fish. Invest. Rep. 39: 180-195.

Love, M.S., M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast

Lauk, T., C. W. Clark, M. Mangel, and G. R. Munro. 1998. Implementing the precautionary principle in fisheries management through marine reserves. Ecological Applications. 8(1) Supplement: S72-S78.

M. McRae, personal comm. (Merit McRea, UCSB, January 2006).

McConnaughey, T., and C. P. McRoy. 1979. C Label Identifies Eelgrass (Zostera marina) Carbon in an Alaskan Estuarine Food Web. Mar. Bio. 53:263-269.

McGinnis, M.V. 2000. A Recommended Study Area for the CINMS Management Planning Process: Ecological Linkages in the Marine Ecology from Point Sal to Point Mugu, including the National Marine Sanctuary. NOAA. CINMS. January.

McGinnis, M.V. In Press. 2006. Negotiating ecology: Marine bioregions and the destruction of the Southern California Bight. FUTURES 38 (3): 1-24.

McGowan, J.A., Cayan, D.R., Dorman, L.M. 1998. Climate-ocean variability and ecosystem response in the Northeast Pacific. Science 281 (5374): 210-216.

Miller, A.J. and N. Schneider. 2000. Interdecadal climate regime dynamics in the North Pacific Ocean: theories, observations and ecosystem impacts. Progress in Oceanography 47: 355-379 Minobe, S. 1999. Resonance in bidecadal and pentadecadal climate oscillations over the North Pacific: role in climate regime shifts. Geophys. Res. Lett. 26: 855-858.

Minerals Management Service. 1987. Isopach map of the post-Wisconsin sediment thickness data sources. California Outer Continental Shelf Archeaological Resource Study from

Morro Bay to the Mexican Border. Prepared by P.S. Associates, Contract number 14-12-0001-30272, May 1, 1987. Map scale was 1:125,000.

Murray, S.N. and M.M. Littler. 1981. Biogeographical analysis of intertidal macrophyte floras of southern. California. J. Biogeogr. 8: 339-351.

Murray, S.N. and R.N. Bray. 1993. In M.D. Dailey, D.J. Reish, and J.W. Anderson. eds. Ecology of the Southern California Bight: A Synthesis and Interpretation. Pp. 304-368. Berkeley, CA: University of California Press.

National Centers for Coastal Ocean Science (NCCOS) 2005. A Biogeographic Assessment of the Channel Islands National Marine Sanctuary & Surrounding Areas: A Review of Boundary Expansion Alternatives for NOAA's National Marine Sanctuary Program. Prepared by NCCOS's Biogeography Team in cooperation with the National Marine Sanctuary Program. Silver Spring, MD. 200 pp.

National Marine Fisheries Service, Marine Recreational Fisheries Statistics Survey (MRFSS). http://www.st.nmfs.gov/st1.

National Oceanic and Atmospheric Administration (NOAA). 2003. Socioeconomic Research and Monitoring Recommendations for Marine Protected Areas in the Channel Islands National Marine Sanctuary. National Oceanic and Atmospheric Administration (NOAA), National Ocean Service, Special Projects: Silver Spring, Maryland. July 2003. http://marineeconomics.noaa.gov/socmonFK/CI_recom.pdf.

National Park Service. 2003. Gaviota Coast Feasibility Study. U.S. Department of the Interior. Washington, D.C.

National Reseach Council (NRC). 2000. Marine protected areas: tools for sustaining ocean ecosystems. National Academy Press, Washington, D.C., USA.

Nishimoto, M.M., and L. Washburn. 2002. Contrasting patterns of eddy circulation and pelagic juvenile fish abundance in the Santa Barbara Channel, California. Marine Ecological Progress Series 241: 183-199.

Pauly, D. and J. Maclean. 2003. In A Perfect Storm: The State of Fisheries and Ecosystems in the North Atlantic Ocean. Island Press, Washington, D.C.

Pacific Coast Groundfish Fishery Management Plan, Essential Fish Habitat Draft Environmental Impact Statement (2005)

Pacific Fishery Management Council, Science and Statistical Committee. 2004. Marine Reserves: Objectives, Rationales, Fishery Management Implications and Regulatory Requirements. Pacific Fishery Management Council's Science and Statistical Committee White Paper, Portland Oregon. http://www.pcouncil.org/reserves/recent/mr_wp_0904.pdf

Paddack, M. J. and J. A. Estes. 2000. Kelp forest fish populations in marine reserves and adjacent exploited areas of central California. Ecological Applications 10(3): 855-870.

Paine, R. T. 1966. Food Web Complexity and Species Diversity. American Naturalist 100(910): 65-

Paine, R. T. 1969. A Note on Trophic Complexity and Community Stability. American Naturalist 103(929): 91-

Palumbi, S.R. 2004. Marine reserves and ocean neighborhoods: The spatial scale of marine populations and their management. Annual Review of Environmental Resources 29: 31-68.

Phillips, R.C. 1984. The ecology of eelgrass meadows in the Pacific Northwest: a community profile. United States Fish and Wildlife Service, OBS 84/24:85.

Pikitch, E.K., C. Santora, E.A. Babcock, A. Bakun, R. Bonfil, D.O. Conoverf, P. Dayton, P. Doukakis, D. Fluharty, B. Heneman, E.D. Houde, J. Link, P.A. Livingston, M. Mangel, M.K. McAllister, J. Pope, and K.J. Sainsbury. 2004. Ecosystem-based Fishery Management. Science 305, July 16.

Pitcher, T. J. 2000. Ecosystem Goals Can Reinvigorate Fisheries Management, Help Dispute Resolution and Encourage Public Support. Fish and Fisheries 1: 99-103.

Power, M. E. and L. S. Mills. 1995. The Keystone Cops Meet in Hilo. Trends in Ecology and Evolution 10(5): 182-184.

Power, M. E., D. Tilman, J. A. Estes, B. A. Menge, W. J. Bond, L. S. Mills, G. Daily, J. C. Castilla, J. Lubcheco, R. T. Paine. 1996. Challenges in the Quest for Keystones. BioScience 46(8): 609-620.

Rebstock, G.A. 2002. Climatic regime shifts and decadal-scale variability in calanoid copepod populations off southern California. Global Change Biology 8, 71-89

Roberts, C. M., S. Andelman, G. Branch, R. H. Bustamante, J. C. Castilla, J. Dugan, B. S. Halpern, K. D. Lafferty, H. Leslie, J. Lubchenco, D. McArdle, H. P. Possingham, M. Ruckelshaus, and R. R. Warner. 2003. Ecological criteria for evaluating canditate sites for marine reserves. Ecological Applications. 13(1) Supplement: S199-S214..

Roberts, C.M. and J.P Hawkins. 2000. Fully-protected marine reserves: a guide. WWF.

Roberts, C.M., B. Halpern, S.R. Palumbi, and R. Warner. 2001. Designing Reserve Networks: Why Small, Isolated Protected Areas Are Not Enough. Conservation Biology 2: 10-17.

Roemmich, D and J. McGowan. 1995b. Climatic warming and the decline of zooplankton in the California Current. Science. 267(5202):1324-1326.

Roemmich, D. and J. McGowan. 1995a. Sampling Zooplankton. Science. pp. 352-353.

Rowe, R.D., Morey, E.R., Ross, A.D, and Shaw, W.D. 1985. Valuing Marine Recreational Fishing on the Pacific Coast. Energy and Resource Consultants, Inc. under contract to National Marine Fisheries

Roy, K, D. Jablolnski, and J.W. Valentine. 1994. Eastern Pacific mulluscan provinces and latitudinal diversity gradient. Proc. Natl. Acad. Sci. 91: 8871-74.

Roy, K., Valentine, J.W., Jablonski, D. and Kidwell, S.M. 1996. Scales of climatic variability and time averaging in Pleistocene biotas: implications for ecology and evolution. Trends in Ecology and Evolution 11: 458-463.

Ruckelshaus, and R. R. Warner. 2003. Application of ecological criteria in selecting marine reserves and developing reserve networks. Ecological Applications 13(1) Supplement 13(1): 215-228.

Ruckelshaus, and R. R. Warner. 2003. Ecological criteria for evaluating candidate sites for marine reserves. Ecological Applications Supplement 13(1): 199-214.

Sagarin, R. D., J. P. Barry, S. E. Gilman, and C. H. Baxter. 1999. Climate-related change in an intertidal community over short and long time scales. Ecological Monographs. 69(4): 465 – 490.

Sanchirico, James and Wilen, James E. 2001. A Bioeconomic Model of Marine Reserve Creation, Journal of Environmental Economics and Management, Vol. 42, Number 3, November 2001, pp.257-276.

Sanchirico, James D. 2004. Designing a Cost-Effective Marine Reserve Network: A Bioeconomic Metapopulation Analysis. Marine Resource Economics. 19(1). Number 1, 2004.

Sanchirico, James D. 2005. Additivity Properties in Metapopulation Models: Implications for the Assessment of Marine Reserves. Journal of Environmental Economics and Management, Volume 49, Issue 1, January 2005.

Santa Barbara Conference & Visitors Bureau and Film Commission. 1999. 1999 Santa Barbara County Visitor Survey. Santa Barbara, California. Service contract NA83ABC00205.

Schroeder, D. M. and M. S. Love. 2002. Recreational fishing and marine fish populations in California. California Cooperative Ocean Fisheries Investigations Reports 43: 182-190.

Schwing, F.B., S. Ralston, and K. M. Sakuma. 2000. Record coastal upwelling in the California Current in 1999. CalCOFI Report 41: 148 - 160.

Schwing, F.B., G. Gaxiola-Castro, J. Goméz-Valdéz, P. M. Kosro, A. W. Mantyla, R. L. Smith, S. J. Bograd, J. García, A. Huyer, B. E. Lavaniegos, M. D. Ohman, W. J. Sydeman, P. A.

Wheeler, C. A. Collins, R. Goericke, K. D. Hyrenbach, R. J. Lynn, W. T. Peterson, and E. Venrick. 2002. The State of the California Current, 2001-2002: Will the California Current System Keep its Cool, Or is El Niño Looming? CalCOFI Report 43: 31-37.

Science Applications International Corporation (SAIC). 1986. Assessment of Long-Tern Changes in Biological Communities of the Santa Maria Basin and Western Santa Barbara Channel B Phase I. Final report submitted by Science Applications International Corporation to the U.S. Department of the Interior, Minerals Management Service, Pacific OCS Region, Under Contract No. 14-12-0001-30032.

Sekercioglu, C.H., Dailey, G.C. and P.R. Ehrlich. 2004. Ecosystem consequence of bird declines. PNAS 101, 52. December 28. 18042-18047.

Smith, K.L. and R.S. Kaufmann. 1994. Long-term discrepancy between food supply and demand in the deep eastern north pacific. Science. 284(5417):1174-1177.

Smith, R.I., and J.T. Carlton. 1975. Light=s Manual: Intertidal Invertebrates of the Central California Coast, 3rd Ed. University of California Press, Berkeley, CA.

Smith, V. Kerry and Kaoru, Y. 1990. Signals or Noise? Explaining the Variation in recreation Benefit Estimates. American Journal of Agricultural Economics, 72 (2): 419-33.

Sobel, J. (1996). "Marine reserves: Necessary tools for biodiversity conservation?", Canadian Museum of Nature. 1996: 8-18.

Sosa-Lopez, A., D. Mouillot, T. D. Chi, and J. Ramos-Miranda. 2005. Ecological indicators based on fish biomass distribution along trophic levels: an application to the Terminos coastal lagoon, Mexico. ICES Journal of Marine Science. 62(3): 453-458.

Spurgeon, J.P.G. 1992. The Economic Valuation of Coral Reefs. Marine Pollution Bulletin: 24(11) 529-536.

Steele, J.H. 1998. Regime Shifts in Marine Ecosystems. Ecological Applications 8(1): S33-S36.

Stein, B.A., L.S. Kutner, and J.S. Adams. 2000. Precious Heritage: The Status of Biodiversity in the United States. Oxford University Press.

Straughan, D., and R.W. Klink. 1980. A Taxonomic Listing of Common Marine Invertebrate Species From Southern California. Tech. Report No. 3 Prep. by Allan Hancock Foundation, Univ. of Southern California, Los Angeles, CA.

Sydeman, W.J. and D.G. Ainley. 1994. Marine birds in the California Current ecosystem: contribution to U.S. Globecâ?Ts goals. U.S. Globec News 7: 4-5, 8.

Sydeman, W.J., M. M. Hester, J. A. Thayer, F. Gress, P. Martin, and J. Buffa. 2001. Climate change, reproductive performance and diet composition of marine birds in the southern California Current system, 1969-1997. Progress in Oceanography 49: 309-329.

Tegner, M. J. and L. A. Levin. 1983. Spiny Lobsters and Sea Urchins – Analysis of a Predator Prey Interaction. Journal of Experimental Marine Biology and Ecology 73(2): 125-150.

Tegner, M. J. and P. K. Dayton. 1991. Sea urchins, El Niños, and the long-term stability of Southern California kelp forest communities. Mar. Ecol. Prog. Ser. 77: 49-63.

Tegner, M.J. and P.K. Dayton. 1987. El Nino effects on southern California kelp forest communities. In A. MacFadyen and E.D. Ford. eds. Adv. Ecology Res. 17: 243-289.

Tegner, M.J., P.K. Dayton, P.B. Edwards, K.L. Riser. 1996. Is there evidence for long-term climatic change in southern California kelp forests? CalCOFI Reports 37: 111-126. October.

Tegner, M.J., P.K. Dayton, P.B. Edwards, K.L. Riser. 1997. Marine Ecol. Prog. Series 146: 117.

Thompson, B., J. Dixon, S. Schroeter, and D.J. Reish. 1993. Benthic Invertebrates. In Ecology of the Southern California Bight: A Synthesis and Interpretation. M.D. Daily, D.J. Resih, and J.W. Anderson (eds.) University of California Press, Berkeley, CA., pp. 369-458.

Thomson, C. J. and Crooke, S. J. 1991. Results of the Southern California Sportfish Economic Survey. NOAA Technical Memorandum NMFS. NOAA-TM-NMFS-SWFSC-164. La Jolla, California.

Thorne-Miller, Boyce. Catena, J.G. 1991. The living ocean :understanding and protecting marine biodiversity. Island Press. Washington, D.C.

Tyler, W. B., K. T. Briggs, D. B. Lewis, and R. G. Ford. 1993. Seabird distribution and abundance in relation to oceanographic processes in the California Current System. In *The status, ecology, and conservation of marine birds in the North Pacific*. K. Vermeer *et al.* (eds). Canadian Wildlife Service. Special Publication. Ottawa. pp. 48-60.

U.S. Department of Commerce (NOAA). 2004. Proposed Northwestern Hawaiian Islands National Marine Sanctuary. Advice and Recommendations on Development of Draft Fishing Regulations Under the National Marine Sanctuaries Act Section 304(a)(5). September 20, 2004.

U.S. Department of Commerce. National Oceanic and Atmospheric Administration (NOAA) 2006. National Marine Sanctuary Program. Section 3.0, “Affected Environment," Volume 2, /Channel Islands/ National Marine Sanctuary Draft Management Plan / Draft Environmental Impact Statement/. Silver Spring, MD.

Viet, R. R., P. Pyle, and J. A. McGowan. 1996. Ocean warming and long-term change in pelagic bird abundance within the California current system. *Marine Ecology Progress Series* **139**: 11–18.

Veit, R.R., J.A. McGowan, D.G. Ainley, T.R. Wahls, and P. Pyle. 1997. Apex marine predator declines ninety percent in association with changing ocean climate. Global Change Biology. 1(3): 23-28.

Venrick, E., S. J. Bograd, D. Checkley, R. Durazo, G. Gaxiola-Castro, J. Hunter, A. Huyer, K. D. Hyrenbach, B. E. Laveniegos, A. Mantyla, F. B. Schwing, R. L. Smith, W. J. Sydeman, and P. A. Wheeler. 2003. The State of the California Current, 2002-2003: Tropic and Subarctic Influences via for Dominance. CalCOFI Report 44: 28-59.

Wegge, T.C., Hanemann, W.M. and Strand, I.E. 1983. An Economic Assessment of Marine Recreational Fishing in Southern California. NOAA Technical Memorandum. Saltonstall-Kennedy Act Cooperative Agreement No. 83-ABH-00063.

Witman, J. D. and F. Smith. 2003. Rapid community change at a tropical upwelling site in the Galapagos Marine Reserve. Biodiversity and Conservation. 12: 25-45.

Worm, B., M. Sandow, A. Oschlies, H. K. Lotze, and R. A. Myers. 2005. Global patterns of predator diversity in the open oceans. Science. 306: 1365-1369.

APPENDIX A. PROPOSED RULE

DICLAIMER: This version of the proposed rule is printed here for the convenience of the reader and is not the official version. Refer to the Federal Register for the official version of this rule.

Billing Code 3510-NK-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

15 CFR Part 922

Docket No. 060707188-6188-01

RIN 0648-AT18

Consideration of Marine Reserves and Marine Conservation Areas Within the Channel Islands National Marine Sanctuary

AGENCY: National Marine Sanctuary Program (NMSP), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce (DOC).

ACTION: Proposed rule.

SUMMARY: NOAA is proposing to establish a network of marine zones within the Channel Islands National Marine Sanctuary (CINMS or Sanctuary). Marine zones are discrete areas that have special regulations differing from the regulations that apply throughout or above the Sanctuary as a whole. The purpose of these proposed zones is to further the protection of Sanctuary biodiversity and complement an existing network established by the State of California in October 2002, and implemented in April 2003, under its authorities. Two types of zones are being proposed by this action: marine reserves and marine conservation areas. All extractive activities (e.g., removal of any Sanctuary resource) and injury to Sanctuary resources would be prohibited in all zones of the Sanctuary designated as marine reserves. Certain lobster fishing and recreational fishing for pelagic species would be allowed within zones of the Sanctuary designated as marine conservation areas, while all other extraction and injury would be prohibited. The CINMS is approximately 1268 square nautical miles. The proposed action would establish approximately 232 square nautical miles of marine reserves and 8.6 square nautical miles of marine conservation areas in the State and Federal waters of the Sanctuary. As part of this action, NOAA is also proposing to modify the terms of designation for the Sanctuary, which were originally published on October 2, 1980 (45 FR 65198), to allow for the regulation of extractive activities, including fishing, in the proposed marine reserves and marine conservation areas, and a slight modification to the outer boundary of the CINMS.

DATES: Comments must be received by [INSERT DATE 60 DAYS FROM PUBLICATION]. Dates for public hearings are:

1. September 26, 2006, 6:15 p.m. to 9:00 p.m., Ventura, California.
2. September 28, 2006, 6:15 p.m. to 9:00 p.m., Santa Barbara, California.

Please refer to **ADDRESSES** for additional information on the public hearings.

ADDRESSES: You may submit comments by any of the following methods:

- E-mail: CINMSReserves.DEIS@noaa.gov. Include in the subject line the following document identifier: Proposed marine reserves in CINMS.
- Federal e-Rulemaking Portal: http://www.regulations.gov. Follow the instructions for submitting comments.
- Mail: Sean Hastings, Channel Islands National Marine Sanctuary, 113 Harbor Way, Suite 150, Santa Barbara, CA 93109.

Copies of the draft environmental impact Statement, regulatory impact review, and initial regulatory flexibility analyses may be obtained from NOAA's Channel Islands National Marine Sanctuary web site at http://channelislands.noaa.gov/ or by writing to Sean Hastings, Resource Protection Coordinator, Channel Islands National Marine Sanctuary,113 Harbor Way, Suite 150, Santa Barbara, CA 93109; e-mail: Sean.Hastings@noaa.gov.

Hearings: The hearing on Tuesday, September 26, 2006, 6:15–9:00 pm will be held in the Sheraton Four Points Hotel, San Buenaventura Ballroom, 1050 Schooner Drive, Ventura, California. The hearing on Thursday, September 28, 2006, 6:15–9:00 pm will be held at the Earl Warren Showgrounds, Exhibit Building, 3400 Calle Real, Santa Barbara, California

Paperwork Burden: Written comments regarding the burden-hour estimates or other aspects of the collection-of-information requirements contained in this proposed rule may be submitted to David Bizot, National Permit Coordinator, 1305 East West Highway, Silver Spring, MD 20910 and by e-mail to David_Rostker@omb.eop.gov, or fax to (202) 395-7285.

FOR FURTHER INFORMATION CONTACT: Sean Hastings, (805) 884-1472; e-mail: Sean.Hastings@noaa.gov.

SUPPLEMENTARY INFORMATION:

I. Background

A. Channel Islands National Marine Sanctuary

The CINMS area is approximately 1,252.5 square nautical miles adjacent to the following islands and offshore rocks: San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock (collectively the Channel Islands), extending seaward to a distance of approximately 6 nautical miles. NOAA designated the CINMS in 1980 to protect the area's rich and diverse range of marine life and habitats, unique and productive oceanographic processes and ecosystems, and culturally significant resources (see 45 FR 65198). The Sanctuary was designated pursuant to NOAA's authority under the National Marine Sanctuaries Act (NMSA; 16 U.S.C. 1431 et seq.). There are significant human uses in the Sanctuary as well, including commercial and recreational fishing, marine wildlife viewing, boating and other recreational activities, research and monitoring activities, numerous educational activities, and maritime shipping.

The waters surrounding California's Channel Islands represent a globally unique and diverse assemblage of habitats and species. This region is a subset of the larger ecosystem of the Southern California Bight, an area bounded by Point Conception in the north and Punta Banda, Mexico in the south. In the area between Santa Barbara Island in the south and San Miguel Island in the northwest, the colder waters of the Oregonian oceanic province in the north converge and mix with the warmer waters of the Californian oceanic province. Each of these two provinces has unique oceanic conditions and species assemblages, which in turn are parts of distinct biogeographic regions. The mixing of these two provinces in the vicinity of the Channel Islands creates a transition zone within the island chain. Upwelling and ocean currents in the area create a nutrient rich environment that supports high species and habitat diversity.

In the Southern California Bight, marine resources have declined under pressure from a variety of factors, including commercial and recreational fishing, changes in oceanographic conditions associated with El Niño and other large-scale oceanographic cycles, introduction of disease, and increased levels of pollutants. The urbanization of southern California has significantly increased the number of people visiting the coastal zone. The burgeoning coastal population has greatly increased the influx of human, industrial, and agricultural wastes to California coastal waters. Population growth has also increased human demands on the ocean, including commercial and recreational fishing, wildlife viewing and other activities. New technologies have increased the yield of sport and commercial fisheries. Many former natural

refuges for targeted species, such as submarine canyons, submerged pinnacles, deep waters, and waters distant from harbors, can now be accessed due to advancements in fishing technology and increased fishing effort.

The significant changes in ecological conditions resulting from the array of human activities in the Channel Islands region are just beginning to be understood. For example, many kelp beds have converted to urchin barrens, where urchins and coralline algae have replaced kelp as the dominant feature. Deep canyon and rock areas that were formerly rich rockfishing grounds have significantly reduced populations of larger rockfish such as cowcod and bocaccio.

In the Southern California Bight, commercial and recreational fisheries target more than 100 fish species and more than 20 invertebrate species. Targeted species have exhibited high variability in landings from year to year (e.g., squid) and in several cases have declined to the point that the fishery has had to be shut down (e.g., abalone). Many targeted species are considered overfished and one previously targeted species (white abalone) is listed as endangered. Excessive bycatch has caused declines of some non-targeted species. The removal of species that play key ecological roles, such as predatory fish, has altered ecosystem structure. Some types of fishing gear have caused temporary or permanent damage to marine habitats. The combination of direct take, bycatch, indirect effects, and habitat damage and destruction has contributed to a negative transformation of the marine environment around the Channel Islands.

B. Marine Zoning

For over twenty years, NOAA has used marine zoning as a tool in specific national marine sanctuaries to address a wide array of resource protection and user conflict issues. Marine zones are discrete areas within or above a national marine sanctuary that have special regulations that differ from the regulations that apply throughout or above the sanctuary as a whole. For example, marine zones are used to regulate the use of motorized personal watercraft in the Monterey Bay National Marine Sanctuary. Marine zones, including areas where all extraction is prohibited, have also been established in the Florida Keys National Marine Sanctuary to provide for varying levels of resource protection.

NOAA has used zoning within the CINMS since its original designation in 1980. For example, the CINMS regulations prohibit:

1. cargo vessels from coming within 1 nautical mile of any island in the CINMS;
2. disturbance of marine mammals or seabirds by flying aircraft below 1,000 feet within 1 nautical mile of any island within the CINMS; and
3. construction upon or drilling into the seabed within 1 nautical mile of any island in the CINMS.

In addition to NOAA, other Federal and State agencies have also established marine zones wholly or partially within the Sanctuary (e.g., California Department of Fish and Game, National Park Service). In 1978, commercial and recreational fishing was prohibited by the State of California in one small marine protected area of the Channel Islands, the Anacapa Island Ecological Reserve. The International Maritime Organization has designated a voluntary vessel traffic separation scheme to guide large vessel traffic running through the Santa Barbara Channel. The National Park Service (NPS) has established several zoned areas within the Channel Islands National Park for different public uses, principally to protect seabird colonies and marine mammal haul outs. More recently, the NPS is instituting a new zoning approach to managing park lands, coasts, and adjacent waters.

Due to historic lows in the stocks of certain rockfish (e.g., cowcod and bocaccio), in 2001 the Pacific Fishery Management Council (PFMC) took emergency action and established large bottom closures to rebuild these stocks. NOAA implemented the Cowcod Conservation Area regulations on January 1, 2001 (66 FR 2338) and the Rockfish Conservation Area emergency regulations on September 13, 2002 (67 FR 57973). The Cowcod Conservation Area and the California Rockfish Conservation Area overlay Sanctuary waters. Finally, in 2002, the California Fish and Game Commission (Commission) authorized the establishment of marine reserves and marine conservation areas within the Sanctuary that prohibit or limit the take of living, geological or cultural marine resources.

C. Channel Islands Marine Reserves Process, 1999-present

The NMSA requires NOAA to periodically review the management plan and regulations for each national marine sanctuary and to revise them, as necessary, to fulfill the purposes and policies of the NMSA (16 U.S.C. 1434(e)). NOAA began the process to review the CINMS management plan and regulations in 1999. Through the scoping process, many members of the

public voiced concern over the State of biodiversity in the CINMS and called for fully protected (i.e., no-take) zones to be established.

In response to concerns about changes in the ecosystem and comments raised during the management plan scoping process, NOAA and the California Department of Fish and Game (CDFG) developed a Federal-State partnership to consider the establishment of marine reserves in the Sanctuary.

Since the marine reserves process is inherently complex, and is a stand-alone action that is programmatically independent of and severable from the more general suite of actions contemplated in the management plan review process, NOAA decided to separate the process to consider marine reserves from the larger CINMS management plan review process. The draft management plan and DEIS for the management plan review were released for public comment on May 19, 2006 (71 FR 29148). NOAA also published a proposed rule to implement the management plan review process on May 19, 2006 (71 FR 29096). Please see http://channelislands.noaa.gov for more information.

The CINMS Advisory Council, a Federal advisory board of local community representatives and Federal, State and local government agency representatives, created a multi-stakeholder Marine Reserves Working Group (MRWG) to seek agreement on a recommendation regarding the potential establishment of marine reserves within the Sanctuary. The CINMS Advisory Council also designated a Science Advisory Panel of recognized experts and a NOAA-led Socio-economic Team to support the MRWG in its deliberations.

Extensive scientific, social, and economic data were collected in support of the marine reserves assessment process. From July 1999 to May 2001, the MRWG met monthly to receive, weigh, and integrate advice from technical advisors and the public. The MRWG reached consensus on a set of ground rules, a mission Statement, a problem Statement, a list of species of interest, and a comprehensive suite of implementation recommendations. The MRWG found that in order to protect, maintain, restore, and enhance living marine resources, it is necessary to develop new management strategies that encompass an ecosystem perspective and promote collaboration between competing interests. A set of goals were also agreed upon by the MRWG:

1. To protect representative and unique marine habitats, ecological processes, and populations of interest.

2. To maintain long-term socioeconomic viability while minimizing short-term socioeconomic losses to all users and dependent parties.

3. To achieve sustainable fisheries by integrating marine reserves into fisheries management.

4. To maintain areas for visitor, spiritual, and recreational opportunities which include cultural and ecological features and their associated values.

5. To foster stewardship of the marine environment by providing educational opportunities to increase awareness and encourage responsible use of resources.

The MRWG developed over 40 different designs for potential marine reserves and evaluated the ecological value and potential economic impact of each design. To do so, members of the MRWG contributed their own expertise to modify designs or generate alternatives and utilized a geospatial tool, known as the Channel Islands Spatial Support and Analysis Tool (CI-SSAT; Killpack et al. 2000). CI-SSAT provided opportunities for visualization, manipulation, and analysis of data for the purpose of designing marine reserves.

After months of deliberation, a consensus design could not be reached and the MRWG selected two designs to represent the diverse views of the group. These designs depict the best effort that each MRWG representative could propose. Ultimately, the CINMS Advisory Council provided the MRWG's two designs, as well as all of the supporting information developed during the process, including background scientific and economic information, to NOAA and the CDFG for consideration and action.

Based on this information and additional internal agency analysis, NOAA and the CDFG crafted a draft reserve network and sent it to the CINMS Advisory Council and the former MRWG, Science Panel and Socio-Economic Team members seeking further input. The draft reserve network was also published in local papers and on the CINMS website to solicit input from the general public. Several meetings were held with constituent groups, including the CINMS Advisory Council's Conservation Working Group, Fishing Working Group and Ports and Harbors Working Group, to discuss the draft network. Following this period of input, the CDFG and NOAA prepared a recommendation for establishing a network of marine reserves. The recommendation proposed a network of marine reserves and marine conservation areas in the same general locations as the MRWG Composite Map. The composite map was forwarded to the SAC and represented two versions of a reserve network, one version from consumptive

interests and the other from non-consumptive interests. These two versions were overlaid on one map, and depicted a number of areas that the constituent groups agreed upon. This recommendation became the basis for the preferred alternative in the State's California Environmental Quality Act (CEQA) environmental review process.

D. Establishment of State Reserves in the CINMS

Due to the fact that the proposed network spanned both State and Federal waters, NOAA and the CDFG determined the implementation of the recommendation would need to be divided into a State phase and a Federal phase. State waters extend from the shore to a distance of three nautical miles. Federal waters extend beyond the limit of State waters to the extent of the exclusive economic zone, with the outer boundary of the CINMS at a distance of approximately six nautical miles from shore. The State phase was to be considered by the Commission under its authorities.

The CDFG completed an environmental review under the requirements of CEQA resulting in the publication of an environmental document. The draft environmental document (ED) was released for public comment on May 30, 2002. Comments were accepted for an extended period until September 1, 2002. The Commission and CDFG received 2,492 letters, e-mails and oral comments. Of this total, 2,445 were form letters that made identical comments.

The Commission certified the final ED on October 23, 2002. At this same meeting, the Commission approved the CDFG's preferred alternative. The CDFG published final regulations implementing the State phase in January 2003. As part of its implementation, the CDFG acknowledged the need for NOAA to implement the proposed action in Federal waters of the CINMS.

E. Federal marine reserves process

Following the publication of the CDFG's final regulations in 2003, NOAA's NMSP initiated the Federal marine reserves process, and hosted scoping meetings with the general public, the CINMS Advisory Council, and PFMC. In 2004, the NMSP released a preliminary environmental document with a range of alternatives for public review. In 2005, the NMSP consulted with local, State, and Federal agencies and the PFMC on possible amendments to the CINMS designation document pursuant to section 303(b)(2) of the NMSA (16 U.S.C.

1433(b)(2)). In addition, in 2005 the NMSP provided the PFMC with the opportunity to prepare draft sanctuary fishing regulations pursuant to section 304(a)(5) of the NMSA (16 U.S.C. 1434(a)(5)) for the potential establishment of marine reserves and marine conservation areas.

In its response to NOAA's letter regarding draft sanctuary fishing regulations, the PFMC Stated its support for NOAA's goals and objectives for marine zones in the CINMS but recommended that NOAA issue fishing regulations under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the relevant authorities of the States of California, Oregon, and Washington rather than under the NMSA. To that end, and in accordance with advice from the NOAA Administrator in his October 19, 2005 letter to the PFMC, the PFMC recommended the Channel Islands marine zones in Federal waters be designated as Essential Fish Habitat and Habitat Areas of Particular Concern with corresponding management measures to prohibit the use of bottom contact gear under Amendment 19 of the Groundfish Fishery Management Plan. To complete the process of addressing closure of the remaining aspect of the marine zones (i.e., in the water column) the PFMC Stated its intent to pursue those closures through other fishery management plan authorities and complementary State laws.

NOAA reviewed the PFMC's recommendations and determined that by themselves they did not have the specificity or record to support the use of the MSA or State laws to establish limited take or no-take zones in the water column and thereby did not fulfill NOAA's goals and objectives for these marine zones in the CINMS. However, Amendment 19 to the Groundfish Fishery Management Plan would implement, in part, the proposed marine zones by prohibiting all bottom contact gear in the proposed zones. Accordingly, the NMSA regulations proposed here would prohibit the take of resources from the proposed zones not prohibited by the Amendment 19 regulations. Further, these NMSA regulations would ensure that, should future changes to the MSA regulations alter the management regime established in Amendment 19, the take of all Sanctuary resources would continue to be regulated pursuant to the Sanctuary's limited-take or no-take prohibitions. Thus, along with Amendment 19, the proposed NMSA regulations would establish comprehensive limited-take and no-take zones in the CINMS in a manner that fulfills NOAA's goals and objectives for these marine zones in the CINMS.

II. Summary of Draft Environmental Impact Statement

In addition to this proposed rule, a draft environmental impact Statement (DEIS) was prepared for the consideration of marine reserves and marine conservation areas within the Sanctuary. The DEIS was prepared in accordance with the NMSA and National Environmental Policy Act of 1969 (NEPA) requirements. The DEIS contains a Statement of the purpose and need for the project, description of proposed alternatives including the no action alternative, description of the affected environment, and evaluation and comparison of environmental consequences including cumulative impacts. The preferred alternative incorporates the network of marine reserves and marine conservation areas originally identified for the Federal phase in the Commission's CEQA document.

III. Proposed Revised Designation Document

Section 304(a)(4) of the NMSA requires that the terms of designation include the geographic area included within the Sanctuary; the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational, or aesthetic value; and the types of activities subject to regulation by the Secretary to protect these characteristics. Section 304(a)(4) also specifies that the terms of designation may be modified only by the same procedures by which the original designation was made. To implement this proposed action, the CINMS Designation Document, originally published in the Federal Register on October 2, 1980 (45 FR 65198), is proposed to be modified as follows (new text in bold and deleted text in brackets and italics]:

1. No change to Article 1, Effect of Designation.
2. Article 2, Description of the Area, is modified by revising it to read:

"Article 2. Description of the Area

"The Sanctuary consists of an area of the waters off the coast of California, of approximately [1252.5] **1268** square nautical miles (nmi) adjacent to the northern Channel Islands and Santa Barbara Island seaward to a distance of **approximately** 6 nmi. The precise boundaries are defined by regulation."

3. No change to Article 3, Characteristics of the Area that Give it Particular Value.
4. Article 4, Scope of Regulation, is modified by adding the following at the end of Section 1:

"**g. Within a marine reserve, marine park, or marine conservation area, harvesting, removing, taking, injuring, destroying, possessing, collecting, moving, or causing the loss of any living or dead organism, historical resource, or any other Sanctuary resource, or attempting any of these activities.**

"h. Within a marine reserve, marine park, or marine conservation area, possessing fishing gear."

5. Article 5, Relation to Other Regulatory Programs, is modified by revising the first sentence of Section 1 to read:

"Section 1. Fishing. The regulation of fishing is not authorized under Article 4**, except within portions of the Sanctuary designated as marine reserves, marine parks, or marine conservation areas established pursuant to the goals and objectives of the Sanctuary and within the scope of the State of California's Final Environmental Document "Marine Protected Areas in NOAA's Channel Islands National Marine Sanctuary" (California Department of Fish and Game, October 2002), certified by the California Fish and Game Commission**."

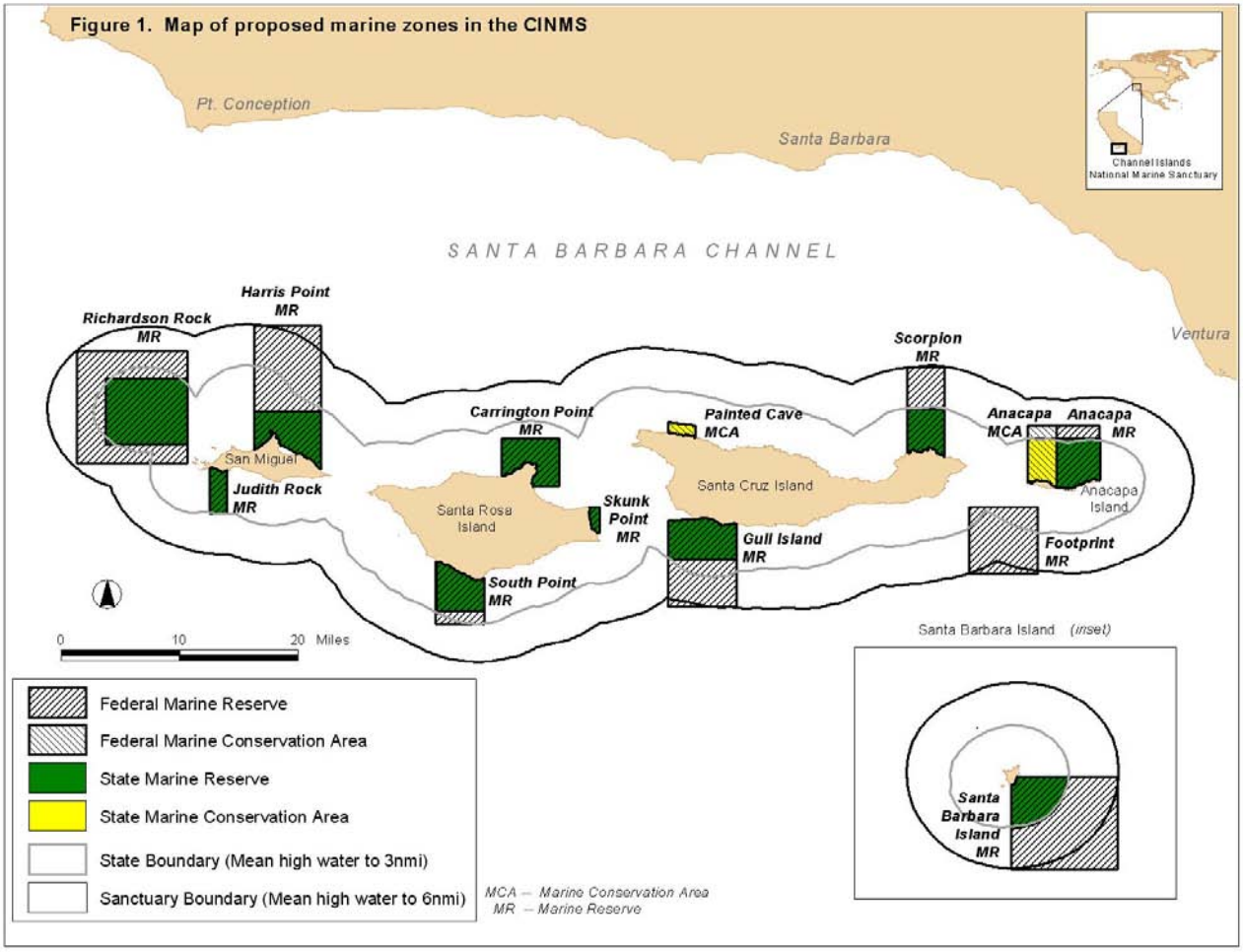
6. No change to Article 6, Alteration to this Designation.

IV. Summary of Proposed Regulations

The proposed regulations would implement NOAA's preferred alternative in the establishment of marine reserves and marine conservation areas within the CINMS. The proposed regulations would define two new terms (pelagic finfish and stowed and not available for immediate use), prohibit injuring Sanctuary resources, prohibit all extractive activities within the marine reserves, and prohibit all extractive activities within the marine conservation areas except recreational fishing for pelagic finfish, and commercial and recreational lobster fishing in the Anacapa Island Marine Conservation Area, and recreational lobster fishing in the Painted Cave Marine Conservation Area. The proposed regulations would also add two new appendices that list the boundary coordinates for the proposed marine reserves and marine conservation areas. The proposed regulations would modify subpart G of the National Marine Sanctuary Program Regulations (15 CFR part 922), the regulations for the Channel Islands National Marine Sanctuary.

A. Establishment of marine reserves and marine conservation areas

The proposed regulations would establish under the NMSA eleven marine reserves and two marine conservation areas within the CINMS. Refer to figure 1 for a map depicting the locations of the marine reserves and marine conservation areas. The marine reserves would be distributed throughout the CINMS and extend slightly beyond the current boundaries of the CINMS in four locations. The total size of the CINMS would increase from 1252 square nautical miles to 1268 square nautical miles, an increase of 16 square nautical miles. The boundaries of the marine reserves and marine conservation areas would be consistent with the marine reserves and marine conservation areas established by the Commission in 2002 in State waters and extend most of them into Federal waters of the Sanctuary.



Under the proposed regulations, NOAA would establish three marine reserves in the area around San Miguel Island, three around Santa Rosa Island, two around Santa Cruz Island, two

around Anacapa Island, and one around Santa Barbara Island. The marine conservation areas would be established in the areas around Santa Cruz and Anacapa Islands.

The total area that would be designated marine reserves under the proposed regulation would be 232.5 square nautical miles. The marine conservation areas would encompass an additional 8.6 square nautical miles.

B. Activities prohibited within the marine reserves

Under the proposed regulations, NOAA would prohibit any harvesting, removing, taking, injuring, destroying, collecting, moving, or causing the loss of any living or dead organism, historical resource, or any other Sanctuary resource, or attempting to do so, within any of the marine reserves. The term "sanctuary resource" is broadly defined in the NMSP regulations at 15 CFR 922.3 and means any living or non-living resource that contributes to the conservation, recreational, ecological, historical, scientific, educational, or aesthetic value of the Sanctuary. For the CINMS, the term "Sanctuary resource" includes, for example, the seafloor and all animals and plants of the Sanctuary. It also includes historical resources (which, pursuant to 15 CFR 922.3, include cultural and archeological resources), such as shipwrecks and Native American remains. In addition, to enhance compliance and aid in enforcement, the proposed regulations would also prohibit possessing fishing gear and Sanctuary resources inside a marine reserve, except in certain circumstances. The proposed regulations would allow possession of legally harvested fish stowed on a vessel at anchor in or transiting through a marine reserve and would also allow the possession of stowed fishing gear, provided the gear is not available for immediate use.

The proposed regulations prohibit only those extractive activities within marine reserves that are not prohibited by 50 CFR part 660, the NOAA regulations that govern "Fisheries off West Coast States" (NOAA fisheries regulations). Therefore, if an extractive activity is prohibited by NOAA fishing regulations, it is not prohibited by the proposed regulation. Conversely, all extractive activities not prohibited by NOAA fisheries regulations would be prohibited by the proposed regulations within marine reserves. In the future, if NOAA were to amend the NOAA fisheries regulations to prohibit additional extractive activities for MSA reasons, that rulemaking

would also propose for comment those activities that would be no longer within the scope of this NMSA regulation.

Regardless of the specific regulatory mechanism, the intended result of this proposed rule is for all extractive activities to be prohibited within the proposed marine reserves.

C. Activities prohibited within the marine conservation areas

The proposed regulations would prohibit the same activities within the marine conservation areas as within the marine reserves except that lobster fishing and recreational fishing for pelagic finfish would be allowed. Both commercial lobster fishing and recreational lobster fishing would be allowed in the marine conservation area at Anacapa Island. Recreational lobster fishing would be allowed in the marine conservation area at Santa Cruz Island. Commercial lobster fishing would not be allowed in the marine conservation area at Santa Cruz Island. Recreational fishing for pelagic finfish would only be allowed within the marine conservation areas. Commercial fishing for pelagic finfish would be prohibited within the marine conservation areas.

Like the proposed regulations for marine reserves, the proposed regulations for the marine conservation areas would only prohibit activities that are not prohibited by applicable NOAA fisheries regulations codified at 50 CFR part 660.

D. Enforcement

The proposed regulations would be enforced by NOAA and other authorized agencies (e.g., CDFG, United States Coast Guard, and National Park Service) in a coordinated and comprehensive way. Enforcement actions for an infraction would be prosecuted under the appropriate statutes or regulations governing that infraction. The result is that enforcement actions may be taken under State of California authorities, the NMSA, the MSA, or other relevant legal authority.

E. Permitting

The NMSP regulations, including the regulations for the CINMS, allow NOAA to issue permits to conduct activities that would otherwise be prohibited by the regulations. Most permits are issued by the Superintendent of the CINMS. Requirements for filing permit applications are

specified in NMSP regulations and the Office of Management and Budget-approved application guidelines (OMB control number 0648-0141). Criteria for reviewing permit applications are contained in the NMSP regulations as well at 15 CFR 922.48. In general, permits may be issued for activities related to scientific research, education, and management. Permits may also be issued for activities associated with the salvage and recovery efforts for a recent air or marine casualty. (Emergency activities would not require a permit.)

Nationwide, NOAA issues approximately 200 national marine sanctuary permits each year. Of this amount, two or three are for activities within the CINMS. The majority of permits issued for activities within the CINMS are for activities related to scientific research. NOAA expects this trend to continue with the proposed regulations. Although there may be an increase in the number of permits requested for activities within the CINMS, NOAA does not expect this increase to appreciably raise the average number of permits issued nationwide. Therefore, NOAA has determined that the proposed regulations do not necessitate a modification to its information collection approval by the Office of Management and Budget under the Paperwork Reduction Act.

V. Miscellaneous Rulemaking Requirements

A. National Marine Sanctuaries Act

Section 304 of the NMSA (16 U.S.C. 1434) requires the Secretary of Commerce in designating a sanctuary to submit Sanctuary designation documents to the United States Congress (Committee on Resources of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate) and Governor of each State in which any part of the Sanctuary would be located. The designation documents are to be submitted on the same date this notice is published and must include the proposed terms of the designation, the proposed regulations, a draft environmental impact Statement, and a draft management plan. The terms of designation may only be modified by the same procedures by which the original designation is made. In accordance with Section 304, the appropriate documents are being submitted to the specified Congressional Committees and the Governor of California.

B. National Environmental Policy Act

In accordance with Section 304(a)(2) of the NMSA (16 U.S.C. 1434(a)(2)), and the provisions of NEPA (42 U.S.C. 4321–4370(a)), a draft environmental impact Statement (DEIS) has been prepared for the proposed action. Copies of the DEIS are available upon request to NOAA at the address listed in the **ADDRESSES** section.

C. Executive Order 12866: Regulatory Impact

Under Executive Order 12866, if the proposed regulations are "significant" as defined in section 3(f) (1), (2), (3), or (4) of the Order, an assessment of the potential costs and benefits of the regulatory action must be prepared and submitted to the Office of Management and Budget. This proposed rule has been determined to be not significant within the meaning of Executive Order 12866.

D. Executive Order 13132: Federalism

The Assistant Secretary for Intergovernmental and Legislative Affairs, Department of Commerce, will consult with appropriate elected officials in the State of California, as appropriate. Since 1999, NOAA has partnered with and supported the State in this effort. During the Federal phase, NOAA has continually briefed the Secretary of Resources and the Director of California Department of Fish and Game. NOAA also held numerous consultations with all California resource management agencies as required under section 303(b)(2) of the NMSA.

E. Regulatory Flexibility Act

In accordance with the requirements of section 603(a) of the Regulatory Flexibility Act (5 U.S.C. 603(a)), NOAA has prepared an initial regulatory flexibility analysis (IRFA) describing the impact of the proposed action on small businesses. Section 603(b) (5 U.S.C. 603(b)) requires that each IRFA contain a description of the reasons the action is being considered, a succinct Statement of the objectives of, and legal basis for, the action, a description of and, where feasible, an estimate of the number of small entities to which the proposed action will apply, a description of the projected reporting, recordkeeping and other compliance requirements of the proposed action, including an estimate of the classes of small entities which would be subject to the requirement and the type of professional skills necessary for preparation of the report or

record, and an identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap or conflict with the proposed action. In addition, section 603(c) (5 U.S.C. 603(c)) requires that each IRFA contain a description of any significant alternatives to the proposed action which accomplish the Stated objectives of applicable statutes and which minimize any significant economic impact of the proposed action on small entities. The IRFA is available upon request to NOAA at the address listed in the **ADDRESSES** section above. A summary of the IRFA follows.

Summary of the Initial Regulatory Flexibility Act Analysis

In accordance with the requirements of section 603(a) of the Regulatory Flexibility Act (RFA) (5 U.S.C. 603(a)), NOAA has prepared an IRFA describing the impact of the proposed regulations on small entities. A Statement of why action by NOAA is being considered and the objectives of, and legal basis for, the proposed rule is contained in the preamble section of the proposed rule and is not repeated here.

The Small Business Administration has established thresholds on the designation of businesses as “small entities”. A fish-harvesting business is considered a "small" business if it has annual receipts not in excess of $3.5 million (13 CFR 121.201). Sports and recreation businesses and scenic and sightseeing transportation businesses are considered “small” businesses if they have annual receipts not in excess of $6 million (13 CFR 121.201). According to these limits, each of the businesses listed below are considered small entities.

All analyses are based on the most recently updated and best available information.

In 2003, there were 441 commercial fishing operations that reported catches from the CINMS. Total commercial fishing revenue from the CINMS was $17.3 million in 2003.

In 1999, there were 18 recreational fishing charter/party boats operating in the CINMS. In 1999, there were 10 consumptive diving charter/party boats operating in the CINMS. Total reported 1999 gross revenue from these consumptive recreational activities was $8.8 million. Total costs for 1999 were reported at $8.4 million. After all costs were paid, the consumptive recreational activities resulted in $420,000 in profit.

In 1999, there were 8 whale watching operations, 7 non-consumptive diving operations, 4 operations that offered kayaking or island sightseeing activities, and 8 sailing operations, within the CINMS. Total reported 1999 gross revenue from these non-consumptive recreational

activities was $2.6 million. Total costs for 1999 were reported at $2.5 million. After all costs were paid, the non-consumptive recreational activities resulted in $82,000 in profit.

Two alternatives plus a no-action alternative were considered. The no action (status quo) alternative would not establish marine reserves and marine conservation areas in the Sanctuary. Therefore there is no economic impact.

Alternative 1, the proposed alternative, including both the existing State network and proposed extensions, would include approximately 232.5 square nautical miles of marine reserves and 8.6 square nautical miles of marine conservation areas for a total of 241.1 square nautical miles of the CINMS. The new proposed Federal areas of alternative 1 potentially impact 0.51% (approximately $124,000) of ex vessel value of commercial catch in the CINMS. The total maximum potential loss to the income of commercial fishing businesses is 0.61% ($440,000) and to the employment of commercial fishing businesses is 0.66% (13 jobs). For consumptive recreation in the CINMS, the estimated maximum potential loss associated with alternative 1 is $935,000 (3.5%) in annual income and about 42 full and part-time jobs (3.7%) in the local county economies. For non-consumptive recreation in the CINMS, the estimated range of potential increases in income generated in the local county economies associated with alternative 1 is between $337 and about $380,000. The estimated range of potential increases in employment in the local county economies is between 0.02 and 19 full and part-time jobs.

Alternative 2, including both the existing State network and proposed extensions, would encompass approximately 275.8 square nautical miles of marine reserves and 12.1 square nautical miles of marine conservation areas for a total of 287.8 square nautical miles of the CINMS. Alternative 2 is larger than alternative 1, and proposes some different reserve areas not proposed in alternative 1. The new proposed Federal areas of alternative 2 potentially impact 0.82% (approximately $197,000) of ex vessel value of commercial catch in the CINMS. The total maximum potential loss to the income of commercial fishing businesses is 0.91% ($650,000) and to the employment of commercial fishing businesses is 0.97% (19 jobs). For consumptive recreation in the CINMS, the estimated maximum potential loss associated with alternative 2 is $1,300,000 (5.0%) in annual income and about 59 full and part-time jobs (5.2%) in the local county economies. For non-consumptive recreation in the CINMS, the estimated range of potential increases in income generated in the local county economies associated with

alternative 2 is between $748 and about $841,000. The estimated range of potential increases in employment in the local county economies is between 0.04 and 44 full and part-time jobs.

There are no new reporting, recordkeeping, or other compliance requirements.

The CINMS lies in part within the area for which the PFMC is responsible for developing fishery management plans (FMPs) under the MSA. As Stated previously, the proposed regulations governing fishing in the Sanctuary are drafted to avoid redundancy with regulations recommended by the PFMC and promulgated by NOAA under the MSA.

For a more detailed analysis consult the IRFA, which is available upon request to NOAA at the address listed in the **ADDRESSES** section above.

F. Paperwork Reduction Act

This rule contains a collection-of-information requirement subject to the Paperwork Reduction Act (PRA) which has been approved by OMB under control number 0648-0141. The public reporting burden for national marine sanctuary permits is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This rule would not modify the average annual number of respondents or the reporting burden for this information requirement, so a modification to this approval is not necessary. Send comments regarding this burden estimate, or any other aspect of this data collection, including suggestions for reducing the burden, to NOAA (see **ADDRESSEES**) and by e-mail to David_Rostker@omb.eop.gov, or fax to (202) 395-7285.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

G. Unfunded Mandates Reform Act of 1995

This proposed rule, if adopted as proposed, would contain no Federal mandates (under the regulatory provisions of Title II of the Unfunded Mandates Reform Act of 1995 (UMRA)) for State, local, and tribal governments or the private sector. Thus, this rule is not subject to the requirements of section 202 and 205 of UMRA.

List of Subjects in 15 CFR Part 922

Administrative practice and procedure, Coastal zone, Education, Environmental protection, Marine resources, Natural resources, Penalties, Recreation and recreation areas, Reporting and recordkeeping requirements, Research.

_____

John H. Dunnigan Date

Assistant Administrator for

Ocean Services and Coastal Zone Management

Accordingly, for the reasons set forth above, 15 CFR Part 922 is proposed to be amended as follows:

PART-922 [AMENDED]

1. The authority for Part 922 continues to read as follows:

Authority: 16 U.S.C. 1431 et seq.

2. Revise § 922.70 to read as follows:

§ 922.70 Boundary.

The Channel Islands National Marine Sanctuary (Sanctuary) consists of an area of the waters off the coast of California of approximately 1268 square nautical miles (nmi) adjacent to the following islands and offshore rocks: San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock (collectively the Islands) extending seaward to a distance of approximately six nmi. The boundary coordinates are listed in appendix A to this subpart.

3. Redesignate §§ 922.71 and 922.72 as §§ 922.72 and 922.74, respectively.

4. Add § 922.71 to subpart G of part 922 to read as follows:

§ 922.71 Definitions.

In addition to those definitions found at § 922.3, the following definitions apply to this subpart:

Pelagic finfish are defined as: northern anchovy (Engraulis mordax), barracudas (Sphyraena spp.), billfishes (family Istiophoridae), dolphinfish (Coryphaena hippurus), Pacific herring (Clupea pallasi), jack mackerel (Trachurus symmetricus), Pacific mackerel (Scomber japonicus), salmon (Oncorhynchus spp.), Pacific sardine (Sardinops sagax), blue shark (Prionace glauca), salmon shark (Lamna ditropis), shortfin mako shark (Isurus oxyrinchus), thresher sharks (Alopias spp.), swordfish (Xiphias gladius), tunas (family Scombridae), and yellowtail (Seriola lalandi).

Stowed and not available for immediate use means not readily accessible for immediate use, e.g., by being securely covered and lashed to a deck or bulkhead, tied down, unbaited, unloaded, or partially disassembled (such as spear shafts being kept separate from spear guns).

5. Add § 922.73 to subpart G to read as follows:

§ 922.73 Marine reserves and marine conservation areas.

(a) Marine reserves. Unless prohibited by 50 CFR part 660 (Fisheries off West Coast States) as of [effective date of final rule], the following activities are prohibited and thus unlawful for any person to conduct or cause to be conducted within a marine reserve described in Appendix B to this subpart:

(1) Harvesting, removing, taking, injuring, destroying, collecting, moving, or causing the loss of any living or dead organism, historical resource, or other Sanctuary resource, or attempting any of these activities.

(2) Possessing fishing gear on board a vessel unless such gear is stowed and not available for immediate use.

(3) Possessing any living or dead organism, historical resource, or other Sanctuary resource, except legally harvested fish on board a vessel at anchor or in transit.

(b) Marine conservation areas. Unless prohibited by 50 CFR part 660 (Fisheries off West Coast States) as of [effective date of final rule], the following activities are prohibited and thus unlawful for any person to conduct or cause to be conducted within a marine conservation area described in Appendix C to this subpart:

(1) Harvesting, removing, taking, injuring, destroying, collecting, moving, or causing the loss of any living or dead organism, historical resource, or other Sanctuary resource, or attempting any of these activities, except:

(i) recreational fishing for pelagic finfish;

(ii) commercial and recreational fishing for lobster within the Anacapa Marine Conservation Area; or

(iii) recreational fishing for lobster within the Painted Cave Marine Conservation Area.

(2) Possessing fishing gear on board a vessel, except legal fishing gear used to fish for lobster or pelagic finfish, unless such gear is stowed and not available for immediate use.

(3) Possessing any living or dead organism, historical resource, or other Sanctuary resource, except legally harvested fish on board a vessel at anchor or in transit.

6. In § 922.74, as redesignated, revise paragraph (a) introductory text to read as follows:

§ 922.74 Permit procedures and criteria.

(a) Any person in possession of a valid permit issued by the Director in accordance with this section and § 922.48 may conduct any activity within the Sanctuary prohibited under §§ 922.72 or 922.73 if such activity is either:

*****

7. Revise Appendix A to subpart G to read as follows:

Appendix A to Subpart G of Part 922—Channel Islands National Marine Sanctuary Boundary Coordinates

[Coordinates listed in this Appendix are unprojected (Geographic) and based on the North American Datum of 1983.]

Point ID Number	Latitude (North)	Longitude (South)
1	33.94138	-119.27422
2	33.96776	-119.25010
3	34.02607	-119.23642
4	34.07339	-119.25686
5	34.10185	-119.29178

Point ID Number	Latitude (North)	Longitude (South)
6	34.11523	-119.33040
7	34.11611	-119.39120
8	34.11434	-119.40212
9	34.11712	-119.42896
10	34.11664	-119.44844
11	34.13389	-119.48081
12	34.13825	-119.49198
13	34.14784	-119.51194
14	34.15086	-119.54670
15	34.15450	-119.54670
16	34.15450	-119.59170
17	34.15142	-119.61254
18	34.13411	-119.66024
19	34.14635	-119.69780
20	34.15988	-119.76688
21	34.15906	-119.77800
22	34.15928	-119.79327
23	34.16213	-119.80347
24	34.16962	-119.83643
25	34.17266	-119.85240
26	34.17588	-119.88903
27	34.17682	-119.93357
28	34.17258	-119.95830
29	34.13535	-120.01964
30	34.13698	-120.04206
31	34.12994	-120.08582
32	34.12481	-120.11104
33	34.12519	-120.16076
34	34.11008	-120.21190
35	34.11128	-120.22707
36	34.13632	-120.25292
37	34.15341	-120.28627
38	34.16408	-120.29310
39	34.17704	-120.30670
40	34.20492	-120.30670
41	34.20492	-120.38830
42	34.20707	-120.41801
43	34.20520	-120.42859
44	34.19254	-120.46041
45	34.20540	-120.50728
46	34.20486	-120.53987
47	34.18182	-120.60041
48	34.10208	-120.64208
49	34.08151	-120.63894
50	34.05848	-120.62862
51	34.01940	-120.58567
52	34.01349	-120.57464

Point ID Number	Latitude (North)	Longitude (South)
53	33.98698	-120.56582
54	33.95039	-120.53282
55	33.92694	-120.46132
56	33.92501	-120.42170
57	33.91403	-120.37585
58	33.91712	-120.32506
59	33.90956	-120.30857
60	33.88976	-120.29540
61	33.84444	-120.25482
62	33.83146	-120.22927
63	33.81763	-120.20284
64	33.81003	-120.18731
65	33.79425	-120.13422
66	33.79379	-120.10207
67	33.79983	-120.06995
68	33.81076	-120.04351
69	33.81450	-120.03158
70	33.84125	-119.96508
71	33.84865	-119.92316
72	33.86993	-119.88330
73	33.86195	-119.88330
74	33.86195	-119.80000
75	33.86110	-119.79017
76	33.86351	-119.77130
77	33.85995	-119.74390
78	33.86233	-119.68783
79	33.87330	-119.65504
80	33.88594	-119.62617
81	33.88688	-119.59423
82	33.88809	-119.58278
83	33.89414	-119.54861
84	33.90064	-119.51936
85	33.90198	-119.51609
86	33.90198	-119.43311
87	33.90584	-119.43311
88	33.90424	-119.42422
89	33.90219	-119.40730
90	33.90131	-119.38373
91	33.90398	-119.36333
92	33.90635	-119.35345
93	33.91304	-119.33280
94	33.91829	-119.32206
95	33.48250	-119.16874
96	33.44235	-119.16797
97	33.40555	-119.14878
98	33.39059	-119.13283
99	33.36804	-119.08891

Point ID Number	Latitude (North)	Longitude (South)
100	33.36375	-119.06803
101	33.36241	-119.04812
102	33.36320	-119.03670
103	33.36320	-118.90879
104	33.47500	-118.90879
105	33.48414	-118.90712
106	33.52444	-118.91492
107	33.53834	-118.92271
108	33.58616	-118.99540
109	33.59018	-119.02374
110	33.58516	-119.06745
111	33.58011	-119.08521
112	33.54367	-119.14460
113	33.51161	-119.16367

8. Add Appendix B to subpart G to read as follows:

Appendix B to Subpart G of Part 922—Marine Reserve Boundaries

[Coordinates listed in this Appendix are unprojected (Geographic) and based on the North American Datum of 1983.]

Table B-1. Richardson Rock (San Miguel Island) Marine Reserve.

The Richardson Rock Marine Reserve boundary is defined by connecting in sequential order the coordinates provided in Table B-1.

Point	Latitude	Longitude
1	34.17333 ^{o}N	-120.47000 ^{o}W
2	34.17333 ^{o}N	-120.60483 ^{o}W
3	34.03685 ^{o}N	-120.60483 ^{o}W
4	34.03685 ^{o}N	-120.47000 ^{o}W

Table B-2. Harris Point (San Miguel Island) Marine Reserve.

The Harris Point Marine Reserve (Harris Point) boundary is defined by NOAA's MHWL along San Miguel Island, the coordinates provided in Table B-2, and the following textual description.

The Harris Point boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along San Miguel Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL northwestward until it intersects the line defined by connecting

Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL northwestward along a straight line toward Point 5 until it again intersects the MWHL. At that intersection, the boundary follows the MWHL northwestward and then southwestward until it intersects the straight line connecting Point 6 and Point 7. At that intersection, the boundary extends from the MHWL along a straight line to Point 7.

Point	Latitude	Longitude
1	34.05170 ^{o}N	-120.38830 ^{o}W
2	34.20492 ^{o}N	-120.38830 ^{o}W
3	34.20492 ^{o}N	-120.30670 ^{o}W
4	34.03000 ^{o}N	-120.30670 ^{o}W
5	34.04830 ^{o}N	-120.33670 ^{o}W
6	34.05830 ^{o}N	-120.35500 ^{o}W
7	34.05170 ^{o}N	-120.38830 ^{o}W

Table B-3. Judith Rock (San Miguel Island) Marine Reserve.

The Judith Rock Marine Reserve (Judith Rock) boundary is defined by NOAA's MHWL along San Miguel Island, the coordinates provided in Table B-3, and the following textual description.

The Judith Rock boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along San Miguel Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL eastward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary then extends from the MHWL to Point 5 along a straight line.

Point	Latitude	Longitude
1	34.03000 ^{o}N	-120.44330 ^{o}W
2	33.97500 ^{o}N	-120.44330 ^{o}W
3	33.97500 ^{o}N	-120.42170 ^{o}W
4	34.02500 ^{o}N	-120.42170 ^{o}W
5	34.03000 ^{o}N	-120.44330 ^{o}W

Table B-4. Carrington Point (Santa Rosa Island) Marine Reserve.

The Carrington Point Marine Reserve (Carrington Point) boundary is defined by NOAA's MHWL along Santa Rosa Island, the coordinates provided in Table B-4, and the following textual description.

The Carrington Point boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along Santa Rosa Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL northward and then westward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL to Point 5 along a straight line. The boundary then extends from Point 5 to Point 6 along a straight line.

Point	Latitude	Longitude
1	34.02170 °N	-120.08670 °W
2	34.06670 °N	-120.08670 °W
3	34.06670 °N	-120.01670 °W
4	34.00830 °N	-120.01670 °W
5	34.00830 °N	-120.04670°W
6	34.02170 °N	-120.08670 °W

Table B-5. Skunk Point (Santa Rosa Island) Marine Reserve.

The Skunk Point Marine Reserve (Skunk Point) boundary is defined by NOAA's MHWL along Santa Rosa Island, the coordinates provided in Table B-5, and the following textual description.

The Skunk Point boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along Santa Rosa Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL northward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL eastward to Point 5 along a straight line.

Point	Latitude	Longitude
1	33.98330 °N	-119.98000 °W
2	33.98330 °N	-119.96700 °W
3	33.95170 °N	-119.96670 °W
4	33.95170 °N	-119.97000 °W
5	33.98330 °N	-119.98000 °W

Table B-6. South Point (Santa Rosa Island) Marine Reserve.

The South Point Marine Reserve (South Point) boundary is defined by NOAA's MHWL along Santa Rosa Island, the coordinates provided in Table B-6, and the following textual description.

The South Point boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along Santa Rosa where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL southeastward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL to Point 5 along a straight line.

Point	Latitude	Longitude
1	33.91670 ^{o}N	-120.16670 ^{o}W
2	33.84000 ^{o}N	-120.16670 ^{o}W
3	33.84000 ^{o}N	-120.10830 ^{o}W
4	33.89670 ^{o}N	-120.10830 ^{o}W
5	33.91670 ^{o}N	-120.16670 ^{o}W

Table B-7. Gull Island (Santa Cruz Island) Marine Reserve.

The Gull Island Marine Reserve (Gull Island) boundary is defined by NOAA's MHWL along Santa Cruz Island, the coordinates provided in Table B-7, and the following textual description.

The Gull Island boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL eastward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary then extends from the MHWL to Point 5 along a straight line. The boundary then extends from Point 5 to Point 6 along a straight line.

Point	Latitude	Longitude
1	33.96700 ^{o}N	-119.85000 ^{o}W
2	33.96700 ^{o}N	-119.88330 ^{o}W
3	33.86195 ^{o}N	-119.88330 ^{o}W
4	33.86195 ^{o}N	-119.80000 ^{o}W
5	33.96170 ^{o}N	-119.80000 ^{o}W
6	33.96700 ^{o}N	-119.85000 ^{o}W

Table B-8. Scorpion (Santa Cruz Island) Marine Reserve.

The Scorpion Marine Reserve (Scorpion) boundary is defined by NOAA's MHWL along Santa Cruz Island, the coordinates provided in Table B-8, and the following textual description.

The Scorpion boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along Santa Cruz Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows

the MWHL westward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL to Point 5 along a straight line.

Point	Latitude	Longitude
1	34.04900 °N	-119.59170 °W
2	34.15450 °N	-119.59170 °W
3	34.15450 °N	-119.54670 °W
4	34.04670 °N	-119.54670 °W
5	34.04900 °N	-119.59170 °W

Table B-9. Footprint Marine Reserve.

The Footprint Marine Reserve boundary is defined by connecting in sequential order the coordinates provided in Table B-9.

Point	Latitude	Longitude
1	33.98343 °N	-119.43311 °W
2	33.98343 °N	-119.51609 °W
3	33.90198 °N	-119.51609 °W
4	33.90198 °N	-119.43311 °W

Table B-10. Anacapa Island Marine Reserve.

The Anacapa Island Marine Reserve (Anacapa Island) boundary is defined by NOAA's MHWL along Anacapa Island, the coordinates provided in Table B-10, and the following textual description.

The Anacapa Island boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MWHL along Anacapa Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL westward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL to Point 5 along a straight line.

Point	Latitude	Longitude
1	34.00670 °N	-119.41000 °W
2	34.08330 °N	-119.41000 °W
3	34.08330 °N	-119.35670 °W
4	34.01670 °N	-119.35670 °W
5	34.00670 °N	-119.41000 °W

Table B-11. Santa Barbara Island Marine Reserve.

The Santa Barbara Island Marine Reserve (Santa Barbara) boundary is defined by NOAA's MHWL along Santa Barbara Island, the coordinates provided in Table B-11, and the following textual description.

The Santa Barbara Island boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along Santa Barbara Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL northeastward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary then extends from the MHWL to Point 5 along a straight line. The boundary then extends from Point 5 to Point 6 along a straight line.

Point	Latitude	Longitude
1	33.47500 °N	-119.02830 °W
2	33.47500 °N	-118.90879 °W
3	33.36320 °N	-118.90879 °W
4	33.36320 °N	-119.03670 °W
5	33.46500 °N	-119.03670 °W
6	33.47500 °N	-119.02830 °W

9. Add Appendix C to Subpart G to read as follows:

Appendix C to Subpart G of Part 9222—Marine Conservation Area Boundaries

Table C-1. Painted Cave (Santa Cruz Island) Marine Conservation Area.

The Painted Cave Marine Conservation Area (Painted Cave) boundary is defined by NOAA's MHWL along Santa Cruz Island, the coordinates provided in Table C-1, and the following textual description.

The Painted Cave boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MHWL along Santa Cruz Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL westward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL to Point 5 along a straight line.

Point	Latitude	Longitude
1	34.07500 °N	-119.88330 °W
2	34.08670 °N	-119.88330 °W
3	34.08330 °N	-119.85000 °W

4	34.06670 °N	-119.85000 °W
5	34.07500 °N	-119.88330 °W

Table C-2. Anacapa Island Marine Conservation Area.

The Anacapa Island Marine Conservation Area (AIMCA) boundary is defined by NOAA's MHWL along Anacapa Island, the coordinates provided in Table C-2, and the following textual description.

The AIMCA boundary extends from Point 1 to Point 2 along a straight line. It then extends along a straight line from Point 2 to the MWHL of Anacapa Island where a line defined by connecting Point 2 and Point 3 with a straight line intersects the MHWL. The boundary follows the MWHL westward until it intersects the line defined by connecting Point 4 and Point 5 with a straight line. At that intersection, the boundary extends from the MHWL to Point 5 along a straight line.

Point	Latitude	Longitude
1	34.01330 °N	-119.44500 °W
2	34.08330 °N	-119.44500 °W
3	34.08330 °N	-119.41000 °W
4	34.00670 °N	-119.41000 °W
5	34.01330 °N	-119.44500 °W

APPENDIX B. NOTICE OF INTENT

Commerce to issue a determination on remand consistent with the instructions set forth in the Panel's decision. The Panel instructed the DOC to provide a report within 45 days detailing how it would comply with their instructions and to complete the remand (within 60 days) not later than January 28, 2003.

The Department of Commerce issued its remand determination on January 28, 2003.

Panel Decision: The Panel, in its decision of April 28, 2003, ordered the Department to revoke the antidumping order.

Dated: May 8, 2003.

Caratina L. Alston,

U.S. Secretary, NAFTA Secretariat.

[FR Doc. 03–12883 Filed 5–21–03; 8:45 am]

BILLING CODE 3510–GT–M

DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

Announcing a Meeting of the Information Security and Privacy Advisory Board

AGENCY: National Institute of Standards and Technology.

ACTION: Notice of meeting

SUMMARY: Pursuant to the Federal Advisory Committee Act, 5 U.S.C. App., notice is hereby given that the Information Security and Privacy Advisory Board (ISPAB) will meet Tuesday, June 10, 2003, from 8:30 a.m. until 5 p.m., Wednesday, June 11, 2003, from 8:30 a.m. until 5 p.m. and on Thursday, June 12, from 8:30 a.m. until 3 p.m. All sessions will be open to the public. The Advisory Board was established by the Computer Security Act of 1987 (Pub. L. 100–235) and amended by the Federal Information Security Management Act of 2002 (Pub. L. 107–347) to advise the Secretary of Commerce and the Director of NIST on security and privacy issues pertaining to federal computer systems. Details regarding the Board's activities are available at *http://csrc.nist.gov/csspab/*.

DATES: The meeting will be held on June 10, 2003, from 8:30 a.m. until 5 p.m., June 11, 2003, from 8:30 a.m. until 5 p.m., and June 12, 2003, from 8:30 a.m. until 3 p.m.

ADDRESSES: The meeting will take place at the DoubleTree Hotel and Executive Meeting Center, 1750 Rockville Pike, Rockville, Maryland.

Agenda

—Welcome and Overview
—ISPAB Work Plan Updates
—One-Day Panel on e-Authentication:
- Session 1—e-Authentication Systems for Government: Understanding the Benefits and Risks of Existing and Emerging Models
- Session 2—Security and Privacy Issues in e-Authentication

—Panel Discussion on Accuracy Requirements for the FBI's National Crime Information Center (NCIC)
—Briefing on Activities of the National Science Foundation's Trusted Computing Program
—Briefing on Information Security Professionals Certification Programs
—Agenda Development for September 2003 ISPAB Meeting
—Wrap-Up

Note that agenda items may change without notice because of possible unexpected schedule conflicts of presenters.

Public Participation: The Board agenda will include a period of time, not to exceed thirty minutes, for oral comments and questions from the public. Each speaker will be limited to five minutes. Members of the public who are interested in speaking are asked to contact the Board Secretariat at the telephone number indicated below. In addition, written statements are invited and may be submitted to the Board at any time. Written statements should be directed to the ISPAB Secretariat, Information Technology Laboratory, 100 Bureau Drive, Stop 8930, National Institute of Standards and Technology, Gaithersburg, MD 20899–8930. It would be appreciated if 35 copies of written material were submitted for distribution to the Board and attendees no later than June 9, 2003. Approximately 15 seats will be available for the public and media.

FOR FURTHER INFORMATION CONTACT: Ms. Joan Hash, Board Secretariat, Information Technology Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8930, Gaithersburg, MD 20899–8930, telephone: (301) 975–3357.

Dated: May 15, 2003.

Arden L. Bement, Jr.,

Director.

[FR Doc. 03–12786 Filed 5–21–03; 8:45 am]

BILLING CODE 3510–CN–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Announcement of Intent To Initiate the Process To Consider Marine Reserves in the Channel Islands National Marine Sanctuary; Intent To Prepare a Draft Environmental Impact Statement

AGENCY: Marine Sanctuaries Division (MSD), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce (DOC).

ACTION: Notice.

SUMMARY: In accordance with the National Marine Sanctuaries Act, as amended, (NMSA) (16 U.S.C. 1431 et seq.), NOAA's National Marine Sanctuary Program (NMSP) is considering the establishment of a network of marine reserves within the Channel Islands National Marine Sanctuary (CINMS or Sanctuary) to maintain the natural biological communities, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes.

Marine reserves are one of a variety of resource management tools used to manage and protect marine resources. This action is being considered to complement the State of California's recent establishment of a network of marine reserves and protected areas within the State waters of the CINMS.

The NMSP will prepare an environmental impact statement which will examine a range of management and regulatory alternatives associated with consideration of marine reserves within the Sanctuary. The NMSP will conduct three public scoping meetings during the scoping period to gather information and other comments from individuals, organizations, and government agencies on the scope, types and significance of issues related to consideration of marine reserves in the Sanctuary. The dates and locations of the public scoping meetings are listed below.

DATES: Written comments must be received on or before July 23, 2003.

ADDRESSES: Written comments may be sent to the Channel Islands National Marine Sanctuary, attn. Sean Hastings, 113 Harbor Way, Suite 150, Santa Barbara, California 93109, by fax to (805) 568–1582, or by electronic mail to *reservesprocess@noaa.gov*. Comments will be available for public review at the same address.

FOR FURTHER INFORMATION CONTACT: Sean Hastings, (805) 966–7107, Ext. 472.

SUPPLEMENTARY INFORMATION: The Sanctuary was designated in September 1980, and consists of 1,252 square nautical miles of open ocean and near shore habitat approximately 25 miles off the coast of Santa Barbara, California, encompassing the waters surrounding San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara Islands from mean high tide to six nautical miles offshore. The NMSP's primary goal is the protection of the Sanctuary's natural and cultural resources contained within its boundaries. The NMSP uses a variety of non-regulatory and regulatory management measures to protect its resources. The Sanctuary is an area of national significance because of its exceptional natural beauty and marine and cultural resources.

In April 1999, the Sanctuary and the California Department of Fish and Game (CDFG) developed a joint Federal and State partnership to consider establishing marine reserves within the Sanctuary. Marine reserves are one of a variety of resource management tools used to manage and protect marine resources. The Channel Islands Marine Reserves Process was initiated in July of 1999, when the Sanctuary Advisory Council (SAC) created a multi-stakeholder Marine Reserves Working Group (MRWG) to seek agreement on the potential establishment of marine reserves within the Sanctuary. Included in the Channel Islands Marine Reserves Process were a SAC designated Science Advisory Panel and a NOAA led Socio-economic Team made up of blue ribbon scientists, academics and practitioners. Extensive scientific and socioeconomic data were collected in support of the reserves process. From July 1999 to May 2001, the MRWG met monthly to receive, weigh, and integrate advice from technical advisors and the public and to develop a recommendation for the SAC. In May 2001, the results of the Channel Islands Marine Reserves Process were forwarded to the SAC, including the MRWG consensus agreements, areas of disagreement, Science Panel advice and socio-economic analysis. A composite map with two reserve network options ranging from 12 to 29 percent of the Sanctuary was also forwarded. In June 2001, the SAC transmitted the full public record of the MRWG and the SAC to the CINMS and CDFG, and charged the agencies with crafting a final recommendation for the California Fish and Game Commission (FGC).

Sanctuary and CDFG staff continued to work with stakeholders in crafting a recommendation. On August 24, 2001 the Sanctuary and CDFG forwarded the results of the Channel Islands Reserves Process and recommended to the FGC a network of reserves and protected areas that would include approximately 25% of the Sanctuary.

The CDFG prepared environmental review documents pursuant to the California Environmental Quality Act (CEQA), which included an analysis of a range of alternative reserves networks, including identifying the Sanctuary and CDFG recommended option as the preferred alternative. On October 23, 2002, the FGC approved the preferred alternative and the establishment of a network of marine reserves and protected areas within State waters of the Sanctuary (approximately 10%). The FGC decision was made based on the culmination of the Channel Islands Marine Reserves Process and the CDFG and NOAA supported alternative for a network of marine reserves in the Sanctuary. The State's network went into effect on April 9, 2003.

The NMSP is initiating a process to consider the establishment of marine reserves within the Sanctuary to complement the State's network of reserves and protected areas. This review process will build upon the nearly four years of work to date on this matter, including the information and analyses contained in the State's CEQA environmental documents. The NMSP anticipates completion of the environmental review process and concomitant documents will require approximately eighteen to twenty-four months.

The NMSP will prepare an environmental impact statement, proposed regulations, and any proposed modifications to the Sanctuary's designation document, as warranted. The environmental impact statement will examine a range of management and regulatory alternatives associated with consideration of marine reserves within the Sanctuary. Any change to the Sanctuary's terms of designation will be pursuant to the requirements of the National Marine Sanctuaries Act, including necessary consultations with Federal and State agencies, the Pacific Fishery Management Council (PFMC), and others, and submission of the environmental impact statement, proposed regulations and any proposed changes to the designation document to Congress, the Governor of the State of California, and the public for comment. Further, the PFMC will be provided the opportunity to prepare draft Sanctuary fishing regulations for the Exclusive Economic Zone portion of the Sanctuary for any marine reserve proposal. Finally, any change to a term of designation would not apply to State waters if the Governor objects during the requisite review period.

For a complete history of the Channel Islands Marine Reserves Process and the State's Environmental Documents please see *http://www.dfg.ca.gov/mrd/channel_islands/* and/or *http://www.cinms.nos.noaa.gov/marineres/main.html*. The same information can also be obtained by contacting John Ugoretz with California Department of Fish and Game, (805) 560–6758 and/or the contact information below.

The Sanctuary is also revising its 1983 Management Plan. A Final EIS and Management Plan are expected by the end of 2003. Please see *http://www.cinms.nos.noaa.gov/marineres/manplan.html* for more information on this independent process.

Public Scoping Meetings: Dates and Locations

The NMSP will conduct three public scoping meetings to gather information and other oral or written comments from individuals, organizations, and government agencies on the scope, types and significance of issues related to consideration of marine reserves in the Sanctuary. These meetings will be conducted in a format to maximize the opportunity for all attendees to provide public comment. The dates, times and location of the meetings are as follows:

(1) Thursday, June 5, 2003, 6:30–9 p.m., Orvene S. Carpenter Community Center, 550 Park Avenue Pt. Hueneme, CA.

(2) Thursday, June 12, 2003, 6:30–9 p.m., Santa Barbara Public Library, Faulkner Gallery, 40 E. Anapamu Street, Santa Barbara, CA.

(3) Friday, July 18, 2003, 1:30–4 p.m., Four Points by Sheraton, 1050 Schooner Drive, Ventura, CA. This meeting will be held with the Sanctuary Advisory Council.

Dated: May 16, 2003.

Jamison S. Hawkins,

Acting Assistant Administrator for Ocean Services and Coastal Zone Management.

[FR Doc. 03–12815 Filed 5–21–03; 8:45 am]

BILLING CODE 3510–08–M

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 050903A]

Marine Mammals; File No. 369–1440–01

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

APPENDIX C. MAILING LIST

The following officials, agencies and organizations will receive the Draft Environmental Impact Statement. The Draft Environmental Impact Statement may be obtained by download from https://channelislands.noaa.gov or by mail in either CD or hard copy format by contacting:

Resource Protection Coordinator,
Channel Islands National Marine Sanctuary
113 Harbor Way, Suite 150,
Santa Barbara, California, 93109

or by email at CINMSReserves.DEIS@noaa.gov
or by fax to (805) 568-1582.

Agencies and Elected Officials

United States Senate

- The Honorable Barbara Boxer
- The Honorable Diane Feinstein

United States House of Representatives

- The Honorable Lois Capps
- The Honorable Elton Gallegly

U.S Senate and House Committees

- Chair, Senate Committee on Commerce, Science, and Transportation
- Chair, House Resources Committee

Federal Agencies and Councils

- Federal Aviation Administration
    - Associate Administrator, Office of Commercial Space Transportation
- Department of the Interior
    - Director, Office of Environmental Policy and Compliance
    - U.S. Fish and Wildlife Service, Regional Director, Pacific Region
    - Minerals Management Service, Regional Director, Pacific OCS Region
    - National Park Service, Director, Pacific West Region
    - National Park Service, Superintendent, Channel Islands National Park
- Environmental Protection Agency
    - Director, Office of Ocean, Wetlands, and Watersheds

- Los Padres National Forest
- Department of State,
    - Deputy Assistant Secretary for Oceans and Fisheries
- Department of Defense,
    - Assistant Deputy Under Secretary for Defense for Environment
    - Deputy Assistant Secretary of the Navy (Environment)
    - Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health)
- United States Coast Guard
    - Commander, 11th Coast Guard District
    - Chief, Law Enforcement Division, 11th Coast Guard District
    - Commanding Officer, U.S. Coast Guard Station Channel Islands
- Regional Water Quality Control Board
- US Army Corps of Engineers, LA District
- National Oceanic and Atmospheric Administration
    - Deputy Assistant Administrator, NOAA National Marine Fisheries Service
    - NOAA Fisheries Southwest Region, Regional Administrator
    - Assistant Administrator, NOAA National Environmental Satellite, Data, and Information Service
    - Coastal Services Center
    - National Environmental Satellite, Data, and Information Service (NESDIS)
- Executive Director and Chair, Pacific Fishery Management Council

State Agencies, Commissions and Boards

- Governor, State of California
- Secretary of Resources, California Resources Agency
- State Historic Preservation Officer, California State Historical Resources Commission
- Director, California Department of Fish and Game
- Director, California Department of Parks and Recreation
- Director, California Department of Water Resources
- Executive Officer, California State Lands Commission
- Executive Director, California Fish and Game Commission
- Director, California Department of Boating and Waterways
- Director, California Department of Conservation
- Executive Director, California Coastal Commission
- Secretary, California Environmental Protection Agency
- Chair and Executive Officer, California State Water Resources Control Board
- California Assembly Committee on Natural Resources

County Government

- Santa Barbara County, Board of Supervisors

- Santa Barbara County Water Agency
- Santa Barbara County Planning and Development, Assistant Director
- San Luis Obispo County Planning Department
- Ventura County Board of Supervisors
- Ventura County Executive Officer
- Ventura County Harbor Department, Director
- Ventura County Library
- County Planning Division

Municipal Entities

- Goleta Sanitary District
- Mayor, City of Morro Bay CA
- Montecito Sanitary District
- Morro Bay Harbor, Director
- Port of Hueneme/Oxnard Harbor District, Executive Director
- Port San Luis Harbor District
- Santa Barbara City, Wastewater System Manager
- Santa Barbara City Creeks Division, Parks and Recreation Department
- San Buenaventura City, Economic Development Director
- Mayor, City of Santa Barbara CA
- Santa Barbara Harbor, Harbor Operations Manager
- Santa Barbara Public Library
- Santa Barbara Waterfront Department, Director
- Ventura Port District, General Manager
- Ventura Harbor, Harbor Master

Sanctuary Advisory Council Representatives as of September 2005

- Agosta, William - Agosta International Marine
- Akins, Leah – California Resources Agency
- Baird, Brian – California Resources Agency
- Baker, Monica – Island Packers, Inc.
- Baker, Lauri – Hotel Sales and Marketing, Santa Barbara
- Barsky, Kristine – California Department of Fish and Game
- Brumbaugh, Dan – American Museum of Natural History
- Bull, Ann – Minerals Management Service
- Cabugos, Paulette – Chumash Maritime Association
- Davis, Gary – National Park Service
- Dunn, W. Scott - Adventours Outdoor Excursions
- Enriquez, Lyle – National Marine Fisheries Service
- Fien, Ronald – U.S. Coast Guard

- Galipeau, Russell – Channel Islands National Park
- Glaser, Warren – Naturalist, Ventura CA
- Grifman, Phyllis – Sea Grant, university of Southern California
- Helms, Greg – The Ocean Conservancy
- Helvey, Mark – National Marine Fisheries Service
- Hoeflinger, Chris – Ventura County Commercial Fishermen's Association
- Kett, Eric – Sea Zen Marine Consulting (former) and Parcel Manager, Hollister Ranch, CA
- Knowlton, Jim – Ocean Futures Society
- Krieger, Lyn – Ventura County Harbor Department
- Krop, Linda – Environmental Defense Center
- LaCorte, Barbara – Hope School, Santa Barbara
- Lum, Matthew - MJL Advisors, Inc.
- Luzader, John – U.S. Coast Guard
- Marshall, Jim – Commercial Fisherman, Santa Barbara CA
- McCrea, Merit – SeaHawk Sportfishing Charters (former), Santa Barbara CA
- Meester, Dianne – Santa Barbara County
- Peveler, Jack – Ventura County Harbor Department
- Piltz, Fred – Minerals Management Service
- Roberson, Stephen - Graves, Roberson & Bourassa
- Roth, Rebecca – California Coastal Commission
- Schobel, Walt – U.S. Air Force
- Spicer, William – Western Gate Publishing
- Stone, Alex – U.S. Navy
- Taylor, Craig – Santa Barbara, CA
- Timm, Gary – California Coastal Commission
- Vojkovich, Marija – California Department of Fish and Game
- Warner, Robert – University of California, Department of Ecology, Evolution, & Marine Biology

Sanctuary Advisory Council Working Groups (active as of 2005)

- Sanctuary Education Team
- Conservation Working Group
- Chumash Community Working Group
- Commercial Fishing Working Group
- Recreational Fishing Working Group
- Military Working Group
- Ports and Harbors Working Group

Other Private Organizations and Businesses

- Alliance of Communities for Sustainable Fisheries

- American Cetacean Society
- Beacon Foundation
- Bluewater Network
- C-PORT
- California Association of Harbor Masters and Port Captains
- California Coastal Protection Network
- California League of Conservation Voters, Santa Barbara
- California Space Authority, Inc.
- Chumash Maritime Association
- Citizens for the Carpinteria Bluffs
- Coastal Resource Information Center, Goleta CA
- Commercial Fishermen of Santa Barbara, Inc.
- Community Environmental Council, Santa Barbara
- Conception Coast Project
- Dave's Marine Fuel Service
- David and Lucile Packard Foundation
- Environmental Center of San Luis Obispo County
- Environmental Defense Center
- Friends of the Elephant Seal
- Friends of the Ellwood Coast
- Joint Oil/Fisheries Liaison Office
- Gaviota Coast Conservancy
- Get Oil Out
- Goleta Valley Land Trust
- Heal the Ocean
- Land Trust for Santa Barbara County
- League for Coastal Protection
- League of Women Voters
- Lompoc Dive Club
- Los Padres ForestWatch
- More Mesa Preservation Coalition
- Morro Coast Audubon Society
- National OCS Coalition
- National Wildlife Federation
- Nature Conservancy of California
- Natural Resources Defense Council
- North Coast Alliance, central California
- Ocean Futures Society
- Pacific Coast Federation of Fishermen's Association
- Pacific Merchant Shipping Association
- Parrotfish Productions Ltd.
- Project AWARE

- Point Conception Ground Fish Association
- Port San Luis Marine Institute
- Regional Alliance for Information Networking
- Santa Barbara Audubon Society
- Santa Barbara ChannelKeeper
- Santa Barbara County Action Network
- Santa Barbara Museum of Natural History
- Save Ellwood Shores
- Seafloor Surveys International, Inc.
- Sea Foam Enterprises
- Shoreline Preservation Fund, Santa Barbara
- Sierra Club, Los Padres Chapter
- Small Wilderness Area Preserves
- Surfrider Foundation, Santa Barbara Chapter
- Surfrider Foundation, Isla Vista Chapter
- Surfrider Foundation, Ventura Chapter
- Surfrider Foundation, San Luis Bay Chapter
- The Ocean Conservancy
- The Otter Project
- Trout Unlimited
- UCLA Institute of the Environment
- UCSB Environmental Affairs Board
- Urban Creeks Council
- USC Wrigley Institute
- Ventura County Commercial Fishermen's Association
- Ventura County Economic Development Association
- Ventura County Environmental Coalition
- Vessel Assist
- West Coast Seafood Processors Association
- WET/tv Productions
- Women's Environmental Watch

APPENDIX D. MEETING HISTORY

The following table identifies the public meetings held on the consideration of marine reserves in the Channel Islands National Marine Sanctuary from 1999 to the present. "PFMC" is the Pacific Fishery Management Council; "SAC" is the Sanctuary Advisory Council; "FGC" is the California Fish and Game Commission.

Group	Meeting Dates	Major Meeting Topics
PFMC	10/30/05 to 11/4/05	PFMC response to draft NMSA Fishing Regulation expected
PFMC	9/18-23/05	PFMC and advisory bodies review NMSA Fishing Regulation (NMSA 304(a)(5) and Supporting Materials
PFMC	6/12-17/05	PFMC presented with opportunity to draft NMSA Fishing Regulation (NMSA 304(a)(5)). NMSP provides Supporting Materials
SAC	5/20/05	Process Update on the second phase environmental review considering marine reserves and conservation areas within CINMS
SAC	5/20/05	Socioeconomic Monitoring Program • Issue background • Social Science Coordinator introduction • Status of social science data collection • Key monitoring questions • Next steps, including Advisory Council role • Advisory Council discussion and questions
PFMC and advisory bodies	4/3-8/05	Met with Groundfish Advisory Subpanel, Habitat Committee, Enforcement Consultants, Coastal Pelagic Species Advisory Subpanel, Coastal Pelagic Species Management Team, and Salmon Advisory Subpanel to provide final input for PFMC recommendations on Designation Document Consultation Letter; report to entire PFMC on letter
SAC	3/18/05	Informational status report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary; Explanation of agency consultation process on possible changes to Sanctuary terms of designation
PFMC and advisory bodies	3/10/05	Report to PFMC on proposed changes to CINMS Designation Document
SAC	1/21/05	Progress report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary. Status of DEIS development and agency consultation process; Update on monitoring and enforcement of existing Channel Islands Marine Protected Areas.
SAC	11/19/04	Informational status report on monitoring and enforcement of Channel Islands MPAs; Informational status report on the environmental review process for considering marine reserves and marine conservation areas within the Sanctuary
PFMC and advisory bodies	11/5/04	Met with PFMC to solicit comments on proposed timeline, alternatives, and analytical content for draft EIS

Group	Meeting Dates	Major Meeting Topics
Ad Hoc Channel Islands Marine Reserve Committee	10/5-6/04	Gave CINMS staff update to ad hoc committee - environmental review process, overview of preliminary document, public input on document, next steps
SAC	9/24/04	Collected public and SAC member/working group comments on preliminary document
Enforcement Consultants	9/15/04	Met with Enforcement Consultants to give general overview of EIS and discuss the input CINMS is seeking.
Research Working Group	9/13/04	Provided background on Channel Islands Marine Reserves Issue and Process and overview of Preliminary Document Sections.
SAC	7/23/04	Status report on monitoring and enforcement of Channel Islands MPAs; Overview of Staff Preliminary Working Draft Document for Consideration of a Network of Marine Reserves and Marine Conservation Areas within the CINMS; Discussion on SAC and Working Group process for document review and comment.
PFMC's Scientific and Statistical Committee (SSC) (Marine Reserves Subcommittee	7/19-20/04	Review of data elements and analytical methods proposed for use in marine reserves DEIS
PFMC and advisory bodies	6/17/04	Update on CINMS schedule for consideration of marine reserves in Federal waters; presentation of draft analytical document, including Alternatives 1-3
SAC	5/21/04	Valuing Marine Protected Areas: A Monitoring Protocol for Recreational Non-Consumptive Use Applied to the Channel Islands National Marine Sanctuary. Final group project report by graduate students from UCSB's Donald Bren School of Environmental Science and Management; "The Marine Stewardship Council's certification and eco-labeling program: Potential for the Channel Islands." Jim Humphreys, Regional Director-Americas; Report on monitoring and management of State MPAs within the Sanctuary; Status report on the Sanctuary's environmental review process to consider MPAs within the CINMS
PFMC's SSC	4/6/04	Met with SSC regarding marine reserves in Federal waters
SAC	3/19/04	Report on monitoring and management of State MPAs within the Sanctuary
SAC	3/19/04	Status report on the Sanctuary's environmental review process to consider MPAs within the CINMS
PFMC and advisory bodies	3/11/04	Report and solicitation of comment on marine reserves in Federal waters portion of CINMS
PFMC	9/10/03	Update on Marine Reserves Issues; Marine Reserves in the Federal Waters Portion of CINMS
PFMC	6/19/03	Planning for Federal Waters Portion of CINMS; Central California Sanctuary Processes Including Krill Ban

Group	Meeting Dates	Major Meeting Topics
SAC	5/16/03	Report on Marine Enforcement Activities at the Islands; introduction of biological and socioeconomic monitoring projects; timeline for Marine Reserves Environmental Review Process
FGC	5/7/03	Update on department monitoring plan for the Channel Islands MPA's
FGC	4/3/03	Update on department monitoring plan for the Channel Islands MPA's
SAC	3/20/03	Federal Marine Reserves update
PFMC	3/12/03	Considerations for Integrating Marine Reserves with Efficient Fisheries Management
FGC	2/6/03	Request for the Commission to reconsider establishment of the Channel Islands MPA's.
SAC	1/17/03	Update on State Marine Reserves Implementation
SAC	11/13/02	Implementation of Phase II process of Federal Reserves in January; DFG give consent for the proposed Marine Reserves
FGC	10/24/02	Public comment on Marine Reserve alternatives to protect between 12 percent and 34 percent of the sanctuary, no change to the existing system, or to include the Reserves with the Marine Life Protection Act coast-wide process.
FGC	10/ 2/02	Eric Larson reported that they have begun subtidal and nonconsumptive use surveys to supplement existing data, and that discussions will continue with fishermen on their concerns with the regulations.
SAC	9/13/02	Identifying priorities for the Socio-Economic Monitoring for Marine Reserves
PFMC	9/11/02	Review of Proposal for Marine Reserves in State Waters of CINMS; Update on other Marine Reserves Processes
FGC	8/1/02	Use marine protected areas (through the Marine Life Protection Act process) as a potential tool to help replenish near shore stocks
SAC	7/12/02	Marine Reserves Regulatory Process Update
PFMC	6/20/02	Review of Proposal for Marine Reserves in State Waters of CINMS; Update on other Marine Reserves Processes
SAC	5/8/02	Marine Reserves Education Plan development, Biological & Socio-Economic Monitoring, and Enforcement Program Development
PFMC	4/9/02	Review Process for CINMS; Update on Other Marine Reserves Processes
SAC	3/15/02	Marine Reserves Regulatory Process Update
PFMC	3/13/02	Status of National Marine Sanctuary Processes Pertaining to Marine Reserves
FGC	3/7/02	Public comment on Marine Reserve alternatives
FGC	2/8/02	Public comment on Marine Reserve alternatives
SAC	1/9/02	Marine Reserves Regulatory Process and Implementation Update
PFMC	10/31/01	Status of Marine Reserves Proposals for CINMS
SAC	10/18/01	Marine Reserves Regulatory Process Update
PFMC, Ad-Hoc Marine Reserve Subcommittee, & SSC	10/1/01	Goals and analytical basis for reserve size; relationship between reserve size and existing management regime; generalization of Science Panel's analysis to other settings

Group	Meeting Dates	Major Meeting Topics
PFMC	9/26/01	Status of Marine Reserves Proposals for CINMS
PFMC	9/11/01	Status Report on West Coast Marine Reserve Activities; Marine Reserve Proposals for CINMS
SAC	6/19/01	SAC marine reserves deliberation – forwarded recommendation to Manager
SAC Fishing Working Group	6/16/01	Fishing Working Group updates and suggestions for Marine Reserves Process
PFMC	6/11/01	Review of West Coast Marine Reserves Efforts; Marine Reserves in the CINMS
MRWG/SAC	5/23/01	Transmission of final MRWG work to the Sanctuary Advisory Council; Marine Reserves Public Forum - Approximately 300 in attendance
Conservation Working Group	5/21/01	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	5/16/01	Final MRWG meeting; agreements on a recommendation to the SAC
SAC Fishing Working Group	5/1401	Fishing Working Group updates and suggestions for Marine Reserves Process
MRWG	4/18/01	Developing a Preferred Reserve network option
PFMC	4/3/01	Channel Islands National Marine Sanctuary Program (CINMSP)
MRWG	3/21/01	Presentations from Science and Economic Panels and
Marine Reserves Working Group	3/21/01	Evening Public Forum – Approximately 300 in attendance
SAC	3/14/01	Sanctuary Advisory Council Marine Reserves Process update
Conservation Working Group	3/12/01	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	2/21/01	Developed Marine Reserve Scenarios
MRWG	2/15/01	Dealt with Unresolved Issues
SAC	2/9/01	Sanctuary Advisory Council Marine Reserves Working Group update
Conservation Working Group	1/16/01	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	1/16/01	Discussion with Science and Socioeconomic Panels
MRWG	12/14/00	Reached closure on Goals and Objectives, developed questions for technical panels
MRWG	12/9/00	Presentation from MWRG members regarding major issues
SAC	11/16/00	Marine Reserves Working Group report and update on Marine Reserves Process
MRWG	11/15/00	MRWG revised work on Goals and Objectives
Conservation Working Group	11/14/00	Conservation Working Group updates and suggestions for Marine Reserves Process
MRWG	10/18/00	MRWG revised work on goals and objectives
MRWG	10/12/00	MRWG Public Forum – Approximately 300 in attendance
MRWG	9/26-27/00	Received Socio-Economic and Science Panel data and recommendations; Crafted preliminary reserve scenarios

Group	Meeting Dates	Major Meeting Topics
SAC	9/20/00	Sanctuary Advisory Council Marine Reserves Working Group Report
PFMC	9/12/00	Marine Reserves Phase I Considerations Report; Marine Reserves Phase II Considerations
MRWG	8/22/00	Discussed data, worked on Goals and Objectives
MRWG	7/18/00	Re-worked Goals and Objectives, Science panel progress, refined overall process
MRWG	6/22/00	Adopted Goals and Objectives (first time); Discussed data needs
MRWG	6/8/00	MRWG Development of Goals and Objectives
SAC	4/19/00	Marine Reserves Science Panel, Socio Economic Panel and Working Group updates
MRWG	4/13/00	Data needs discussion, set future process
PFMC	4/5/00	Staff Report on Phase I of Considerations of Marine Reserves as a Management Measure
MRWG	3/16/00	Task groups, Goals and Objectives
SAC	3/15/00	Marine Reserves Working Group and Marine Reserves Process Update
MRWG	2/23/00	Response to Science Panel, worked on goals and objectives
MRWG	1/20/00	MRWG Public Forum – Approximately 200 in attendance
MRWG	1/10-11/00	Joint meeting with Science and Socio economic panels, crafted goals & objectives
SAC	11/18/99	Marine Reserves Science Panel, Socio Economic Panel and Working Group updates
MRWG	11/10/99	Discussed revisions and finalized ground rules
MRWG	10/21/99	Adopted draft ground rules
SAC	10/5/99	Sanctuary Advisory Council Marine Reserves Update
PFMC	9/16/99	Ad-Hoc Marine Reserve Committee Report; Comments of Advisory Entities and Public; Council Direction to Committee - ACTION
SAC	7/22/99	Sanctuary Advisory Council Marine Reserves Update
MRWG	7/7/99	Introduction to the issue and proposed process
PFMC	6/22/99	Ad-Hoc Marine Reserve Committee Report; Comments of Advisory Entities and Public; Council Direction to Committee - ACTION
SAC	5/20/99	Initial Development of Marine Reserve Working Group and Science Panel
SAC	3/ 5/99	Sanctuary Advisory Council update on Marine Reserve issue and SAC opportunity

APPENDIX E. SUMMARY OF PUBLIC SCOPING COMMENTS

The CINMS received both written and verbal comments during the public scoping period from May 22-July 23, 2003. Comments were solicited at the following public meetings:

- June 5 in Pt. Hueneme
- June 12 in Santa Barbara
- June 16-20 in Foster City, Pacific Fishery Management Council
- June 26 in Santa Barbara, Conservation Working Group, (SAC
- July 15 in Carpinteria, Business Working Group, SAC
- July 18 in Ventura, SAC

Major constituencies represented and providing comments:

- SAC members, alternates and working group members
- Pacific Fishery Management Council subpanel and committee members
- Recreational fishing organizations and individuals
- Commercial Fishing organizations and individuals
- Environmental organizations and individuals
- Congresswoman Capps' office
- State and Federal Agencies
- General Public

The following summary illustrates the range of public comments received:

- Expand marine reserve areas to complete a scientifically based network to include the variety of habitats, depth ranges and species with connectivity between reserves
- Existing fisheries management is working, do not expand State Marine Protected Areas
- Consider impacts of pollution, oil slicks, sewage, nuclear/toxic waste
- Allow pelagics to be harvested recreationally from zoned areas
- Protect pelagics in zoned areas
- Reserves provide heritage and intrinsic values, consider value to general public
- Demonstrate administrative and monitoring capabilities before considering expansion
- Consider marine parks that allow recreational fishing to test impacts of recreational fishing
- Consider broad range of alternatives and management tools, not just reserves
- Ensure management actions are enforceable/provide adequate enforcement
- Need to fund socioeconomic effects to understand fishery impacts
- Support experimental/adaptive approach
- Consider birds and marine mammals

The following is a subset of SAC comments:

- Utilize the Marine Reserves Working Group work and address areas of consensus and non-consensus. Build on the existing State environmental process documents and information
- Clearly define the purpose and need for considering additional marine reserves
- Keep the marine reserves and management plan NEPA processes separate. Time is of the essence; given four years of community process it is critical to move forward
- Reserve size will determine the scale and timing of effects, i.e., small reserves will have a smaller effect and take longer to realize versus larger reserves
- Consider the costs and benefits of phasing to the resources and economy over time
- Describe the agency's commitment and processes toward long-term management
- Consider the socioeconomic effects of the groundfish closures
- Recreational fishing impacts on resources need to be considered
- Analyze positive and negative impacts to consumptive and non-consumptive users
- Establish socioeconomic impact thresholds of significance (as required by NEPA).
- The Sanctuary is encouraged to work with agency partners and the PFMC
- The recommendation chosen by the State was developed jointly by the California DFG and the Sanctuary and should be one of the alternatives considered

The following is a summary of Pacific Fishery Management Council (PFMC) comments:

Sanctuary staff met with the PFMC, Habitat Advisory Panel, California Delegation, Science and Statistical Committee (SSC), Enforcement Advisory Group and the Groundfish Advisory Panel (GAP). The Habitat, SSC, GAP and Enforcement groups submitted written Statements that have been forwarded with the PFMC Statement.

Planning for Federal Waters Portion of the Channel Islands National Marine Sanctuary

"The Council directed staff to forward all prepared Statements of its advisory bodies on the topic of marine reserves in the CINMS, as well as the April 24 letter from the Council to CINMS, as formal scoping comments to the CINMS. In addition, the Council directed that its Ad Hoc Marine Reserves Committee meet to review the CINMS preliminary draft environmental document, the draft CINMS management plan, and a summary of scoping comments provided by CINMS, and to provide recommendations to the Council as appropriate. Finally, the Council directed the chair of the SSC Marine Reserves Subcommittee to work with CINMS staff on providing clarification of earlier SSC comments on CINMS environmental documents. " (PFMC Website)

General comments from the PFMC sub-panels and committees:

- The State Environmental Documents are inadequate
- Clarify the processes to revise the CINMS Management Plan, amend the Designation Document and consider marine reserves under the National Marine Sanctuaries Act
- Concern that CINMS is usurping fisheries management
- The CINMS public process and SAC representation is unfair

APPENDIX F. FISHERY MANAGEMENT MEASURES

Table F1 summarizes the existing commercial fishing prohibitions in the Southern California region as of April 7, 2005. Note that this is not a complete reproduction of all fishing regulations (e.g., quotas, size limits, in-season adjustments in allowable take and gear restrictions) and should not be used for legal compliance.

Table F1: Existing Commercial Fishing Prohibitions In The Southern California Region

Species	Gear Type	Season	Regulations
Abalone			Abalone may not be taken, possessed, or landed for commercial purposes.
All Groundfish (some exceptions)	All Gear Types	March 1 - April 30	Closed Season
All Groundfish (some exceptions)	Non-trawl (Fixed)	Jan 1 - Dec 31	Fishing is prohibited in waters greater than 60 fathoms and less than 150 fathoms south of Point Conception.
All Groundfish (some exceptions)	Trawl	Jan 1- Feb 28 and Nov 1-Dec 31	Fishing is prohibited in waters greater than 75 fathoms and less than 150 fathoms along the mainland, and from the shoreline to 150 fathoms around the islands.
All Groundfish (some exceptions)	Trawl	Mar 1-Oct 31	Fishing is prohibited in waters greater than 100 fathoms and less than 150 fathoms along the mainland, and from the shoreline to 150 fathoms around the islands.
Sheephead	All Gear Types	March 1-April 30	Closed Season
All Species – Marine Resources Protection Zone	Gill Nets and Trammel Nets		Prohibited in waters less than 70 fathoms or within 1 nautical mile, whichever is less, around the Channel Islands (San Miguel, Santa Rosa, Santa Cruz, Anacapa, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente).
Rockfish	Gill Nets and Trammel Nets		Use Prohibited in State waters for the take of rockfish.
Rockfish & Lingcod	Gill Nets and Trammel Nets		Prohibited in waters less than 70 fathoms in depth south of Point Sal, except drift and set gill nets shall not be used in waters less than 100 fathoms in depth at Sixty-Mile Bank. Prohibition on the take of rockfish in State waters applies.
Swordfish & Shark	Drift Gill Nets	Feb 1 to April 30	Closed Season
Swordfish & Shark	Drift Gill Nets	May 1 to Aug 14	Use prohibited within 75 nautical miles of the mainland coast between the westerly extension of the CA-OR boundary and the westerly extension of the US-Mexico boundary.

Table F1: Existing Commercial Fishing Prohibitions In The Southern California Region

Species	Gear Type	Season	Regulations
Swordfish & Shark	Drift Gill Nets	May 1 to July 31	Use prohibited within 6 nautical miles westerly, northerly, and easterly of the shoreline of San Miguel Island between a line extending 6 nautical miles west from Point Bennett and a line extending 6 nautical miles east from Cardwell Point and within 6 nautical miles westerly, northerly, and easterly of the shoreline of Santa Rosa Island between a line extending 6 nautical miles west from Sandy Point and a line extending 6 nautical miles east from Skunk Point.
Swordfish & Shark	Drift Gill Nets	May 1 to July 31	Use prohibited within 10 nautical miles westerly, southerly, and easterly of the shoreline of San Miguel Island between a line extending 10 nautical miles west from Point Bennett and a line extending 10 nautical miles east from Cardwell Point and within 10 nautical miles westerly, southerly, and easterly of the shoreline of Santa Rosa Island between a line extending 10 nautical miles west from Sandy Point and a line extending 10 nautical miles east from Skunk Point.
Swordfish & Shark	Drift Gill Nets	Dec 15 to Jan 31	Use prohibited in ocean waters within 25 nautical miles of the mainland coast.
Squid	Round Haul Nets	January 1-December 31	Season closed from noon Friday until noon Sunday each week.
Yellowtail, barracuda, white seabass, salmon, steelhead, striped bass, and shad	Round Haul Nets		Use prohibited to take these species.
All Species	Trawl Nets		Prohibited out to 3 miles offshore mainland coast. (Except California halibut trawl grounds, 1-3 miles offshore between Pt. Arguello and Pt. Mugu). Special restrictions apply.
Halibut	Trawl Nets	March 15 - June 15	Closed Season - California Halibut Trawl Grounds. Use prohibited in waters between one and three nautical miles from the mainland shore between Pt. Arguello and Pt. Mugu.
Pink Shrimp	Trawl Nets	November 1 - March 31	Closed Season for Pacific Ocean Shrimp.
Prawns & Shrimp	Traps		Use prohibited from Point Conception south to the Mexican border inside 50 fathoms depth.
Spot Prawn	Traps	November 1-January 31	Closed Season between line drawn due west from Pt. Arguello and US-Mexico boundary.
Spot Prawn	Trawl		Use prohibited

Table F1: Existing Commercial Fishing Prohibitions In The Southern California Region			
Species	**Gear Type**	**Season**	**Regulations**
Sea urchin (Red)		Various Closures - April through October	In April, May, September and October the closed days are Friday through Sunday. In June and August the closed days are Thursday through Sunday. In July the closed days are Wednesday through Sunday.
Lobster	Traps	First Thur. after March 15th to 1st Tue. in October	Closed Season

Table F2 summarizes the existing recreational fishing prohibitions in the southern California region as of April 7, 2005. Note that this is not a complete reproduction of all fishing regulations (e.g., bag limits, size limits, in-season adjustments in allowable take and gear restrictions) and should not be used for legal compliance.

Table F2: Existing Recreational Fishing Prohibitions in the Southern California Region		
Species	**Season**	**Regulations**
Abalone		May not be taken
Garibaldi, giant (black) sea bass, gulf and broomtail grouper, canary rockfish, cowcod rockfish, yelloweye rockfish, white shark		May not be taken
Grunion	April 1 - May 31	Closed Season
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio.	January 1 - February 28	Closed Season for boat-based anglers; open year-round for divers and shore-based anglers[1].
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio	March 1 – April 15	Take is prohibited in waters greater than 60 fathoms and less than 30 fathoms south of Point Conception.
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio	April 16 – August 31, and November 1-December 31	Take is prohibited in waters greater than 60 fathoms south of Point Conception.
Rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio	September 1-October 31	Take is prohibited in waters greater than 30 fathoms south of Point Conception.
CA scorpionfish (sculpin)	January 1 - September 30	Closed Season for boat-based anglers; open year-round for divers and shore-based anglers.
CA scorpionfish (sculpin)	October 1-October 31	Take is prohibited in waters greater than 30 fathoms south of Point Conception
CA scorpionfish (sculpin)	November 1-December 31	Take is prohibited in waters greater than 60 fathoms south of Point Conception

Table F2: Existing Recreational Fishing Prohibitions in the Southern California Region		
Species	**Season**	**Regulations**
Lingcod	January 1-March 31, and December 1-December 31	Closed Season for boat-based anglers, divers, and shore-based anglers.
Lingcod	April 1 – April 15	Take is prohibited in waters greater than 60 fathoms and less than 30 fathoms south of Point Conception.
Lingcod	April 16 – August 31, and November 1-November 30	Take is prohibited in waters greater than 60 fathoms south of Point Conception.
Lingcod	September 1-October 31	Take is prohibited in waters greater than 30 fathoms south of Point Conception.
Lobster	First Thur.after March 15th to the Fri. before the 1st Wed. in October	Closed Season
Salmon	September 29 – April 2	Closed Season[2]

[1] Shore-based anglers and divers are exempt from depth restrictions affecting boat-based anglers fishing for rockfish, cabezon, greenlings, CA sheephead, ocean whitefish, and bocaccio.
[2] Salmon fishing seasons are set on an annual basis. The closed season shown here was for the 2004 ocean salmon fishery and may change in the future.

APPENDIX G. HABITAT AND SPECIES OF INTEREST

Habitat: Hard (30-100 m)

Macrocystis pyrifera (subtidal to 40 m)
Egregia menziesi (subtidal to 20-30 m)
Egregia laevigata (subtidal to 20-30 m)
[3]Pelagophycus porra (30-90 m)
[3]Laminaria farlowii (subtidal to 50 m)
Agarum fimbriatum (subtidal to 115 m)
[4]Ostrich-Plume Hydroid (intertidal to 35 m)
Garveia annulata (subtidal to 120 m)
Obelia spp. (subtidal to 50 m)
Sertularella turgida (subtidal to 160 m)
Tubularia crocea (subtidal to 40 m)
Sertularia frucata (subtidal to 50 m)
Red Gorgonian (16-66 m)
[3]California Golden Gorgonian (subtidal to 30 m)
[3]Brown Gorgonian (subtidal to 33 m)
Colonial Sand Tube Worm (intertidal to 80 m)
Giant Acorn Barnacle (intertidal to 90 m)
Giant Starfish (intertidal to 88 m)
[4]Ochre Starfish (intertidal to 88 m)
[1]California Sea Cucumber (subtidal to 90 m)
[1]Warty Sea Cucumber (subtidal to 30 m)
[1]Red Sea Urchin (subtidal to 90 m)
Purple Sea Urchin (subtidal to 160 m)
[1,2]Pink Abalone (6-60 m)
[1,2]Red Abalone (intertidal to 180 m)
[1,2]White Abalone (25-66 m)
[1]Kellet's Whelk (subtidal to 70 m)
[1]Rock Scallop (subtidal to 50 m)
[1,3]California Spiny Lobster (subtidal to 60 m)
[1,3]Red Rock Shrimp (subtidal to 60 m)
[1]Spot Prawn (subtidal to 450 m)
[1]Ridgeback Shrimp (subtidal to 150 m)
[1]Red Crab (mid intertidal to 80 m)
[1]Rock Crab (intertidal to 40 m)
[1]Sheep Crab (6-124 m)
California Scorpionfish (shallow subtidal to 183 m)
[1,4]Pacific Ocean Perch (subtidal to 640 m)
[1,2]Kelp Rockfish (shallow subtidal to 58 m)
[1,2]Brown Rockfish (shallow subtidal to 128 m)
[1,2]Gopher Rockfish (subtidal to 80 m)
[1,2]Copper Rockfish (subtidal to 183 m)
[1,2]Greenspotted Rockfish (30 to 363 m)
[1,2,4]Black and Yellow Rockfish (subtidal to 37 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2]Starry Rockfish (24 to 274 m)
[1,2,3]Calico Rockfish (subtidal to 256 m)
[1,2,4]Widow Rockfish (24 to 549 m)
[1,2]Cowcod (40 to 491 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2]Vermillion Rockfish (6 to 436 m)
[1,2,4]Blue Rockfish (subtidal to 549m)
[1,2,3]Speckled Rockfish (60 to 150m)
[1,2]Boccacio (12 to 478 m)
[1,2]Canary Rockfish (subtidal to 439 m)
[1,2]Grass Rockfish (shallow subtidal to 46 m)
[1,2,4]Yelloweye Rockfish (15-549 m)
[1,2]Flag Rockfish (30 to 418 m)
[1,2,4]Olive Rockfish (shallow subtidal to 172 m)
[1,2,3]Treefish (9 to 30 m)
[1,2,3]Honeycomb Rockfish (30 to 270 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[1,2]Cabezon (subtidal to 120 m)
[1,2,3]Giant Sea Bass (subtidal to 46 m)
[1]Kelp Bass (subtidal to 46 m)
[1]Ocean Whitefish (subtidal to 91 m)
[1,3]White Seabass (subtidal to 122 m)
[1,3]Halfmoon (subtidal to 40 m)
[1]Black Surfperch (subtidal to 46 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)
[1]Rubberlip Surfperch (subtidal to 52 m)
Blacksmith (subtidal to 50 m)
[1,2]California Sheephead (subtidal to 93 m)

Habitat: Hard (>200 m)

Black hydrocoral
[1]Spot Prawn (subtidal to 450 m)
[1,2]Greenspotted Rockfish (30 to 363 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2]Starry Rockfish (24 to 274 m)
[1,2,3]Calico Rockfish (20 to 256 m)
[1,2,4]Widow Rockfish (24 to 549 m)
[1,2]Cowcod (40 to 491 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2]Vermillion Rockfish (6 to 436 m)
[1,2,4]Blue Rockfish (subtidal to 549m)
[1,2]Boccacio (12 to 478 m)
[1,2]Canary Rockfish (subtidal to 439 m)
[1,2,4]Yelloweye Rockfish (15-549 m)
[1,2]Flag Rockfish (30 to 418 m)
[1,2,4]Olive Rockfish (shallow subtidal to 172 m)
[1,2,3]Honeycomb Rockfish (30 to 270 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[4]Pacific Ocean Perch (subtidal to 640 m)

Habitat: Soft (30-100 m)

Zostera spp. (to 30 m)
Sertularia frucata (subtidal to 50 m)
[1]Warty Sea Cucumber (subtidal to 30 m)
[1]Red Rock Shrimp (subtidal to 60 m)
[1]Spot Prawn (subtidal to 450 m)
[1]Ridgeback Shrimp (subtidal to 150 m)

[1]Rock Crab (intertidal to 40 m)
[1]Sheep Crab (6-124 m)
[3]Leopard Shark (4-91 m)
[1]Pacific Angel Shark (3-46 m)
Soupfin Shark (subtidal to 411 m)
[3]Thornback Ray (subtidal to 50 m)
[1,2]Pacific Cod (12-550 m)
California Scorpionfish (shallow subtidal to 183 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2,3]Calico Rockfish (20 to 256 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2,4]Blue Rockfish (subtidal to 549m)
[1,2]Shortspine Thoryhead (20 to 1524 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[4]Pacific Ocean Perch (90 to 825 m)
[1]California Halibut (shallow subtidal to 183 m)
[1]Black Surfperch (subtidal to 46 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)
[1]Rubberlip Surfperch (subtidal to 52 m)
[1,4]Starry Flounder (subtidal to 275 m)
[1]C-O Turbot (subtidal to 383 m)

Habitat: Soft (100-200 m)
[1]Ridgeback Shrimp (subtidal to 150 m)
Soupfin Shark (subtidal to 411 m)
[1,2]Pacific Cod (12-550 m)
California Scorpionfish (shallow subtidal to 183 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2,3]Calico Rockfish (20 to 256 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2]Shortspine Thoryhead (20 to 1524 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[4]Pacific Ocean Perch (90 to 825 m)
[1]California Halibut (shallow subtidal to 183 m)
[1]Walleye Surfperch (subtidal to 200 m)
[1]Silver Surfperch (subtidal to 120 m)
[14]Starry Flounder (subtidal to 275 m)
[1]C-O Turbot (subtidal to 383 m)

Habitat: Soft (>200 m)
Soupfin Shark (subtidal to 411 m)
[1,2]Pacific Cod (12-550 m)
[1,2,4]Darkblotched Rockfish (25 to 904 m)
[1,2,3]Calico Rockfish (20 to 256 m)
[1,2,4]Black Rockfish (subtidal to 366 m)
[1,2,4]Blue Rockfish (subtidal to 549m)
[1,2]Shortspine Thoryhead (20 to 1524 m)
[4]Pacific Ocean Perch (90 to 825 m)
[1,2]Lingcod (shallow subtidal to 443 m)
[1,4]Starry Flounder (subtidal to 275 m)
[1]C-O Turbot (subtidal to 383 m)

Pelagic Species
[1]Market Squid
[12]Pacific Herring
[12]Pacific Sardine
[1]Northern Anchovy (surface to 300 m

Notes:
[1] Fished
[2] Requires some restoration / exhibited long term or rapid decline
[3] Warmer water species
[4] Colder water species

APPENDIX H. HABITAT AND ECOLOGICAL FUNCTION

The following table identifies habitat associations of ecological functions for select groundfish species within the CINMS region. Information is excerpted from Love *et al.* (2002); Pacific Coast Groundfish Fishery Management Plan, Essential Fish Habitat Draft Environmental Impact Statement (2005)

Species	Ecological Function	Habitat
Black, blue, olive, kelp, black-and-yellow, gopher rockfishes	Growth to maturity	High in water column, usually near kelp or pilings, deeper in winter
	Larval growth	Pelagic zone
	Juvenile growth	Pelagic zone
	Juvenile settlement	Shallow kelp beds, kelp canopy, seagrass beds, high relief rock, sand, sand-rock interface, and midwater column
Black rockfish	Growth to maturity	Crevices, sand channels among rocks or depressions in reefs
	Schooling	Mid-water over high relief rocks, boulders, pinnacles
	Foraging	Water column
	Mating	Water column, surface to 10 m depth, along rock wall
	Larval development	Pelagic zone
Blue rockfish	Growth to maturity	Kelp beds
	Foraging	Kelp beds
	Courting mates	Water column
	Larval development	Pelagic zone
Black and yellow rockfish	Growth to maturity	Sandy areas near low relief rock formations
	Larval development	Nearshore water column, surface kelp canopy and drift alga
Brown Rockfish	Feeding	Sandy low relief habitat
Bocaccio	Juvenile settlement	Rocky areas with algae and sandy areas with eelgrass or drift algae
Leopard shark	Feeding	Mud in littoral and benthic habitats
Soupfin shark	Feeding	Bottom, mid-water column, and surface;
	Birthing	Bays
Lingcod	Spawning	3-10 m below mean low low water over rocky reefs;
	Larval development	Epipelagic, upper 3 m of the water column
	Juvenile development	Sandy and rocky substrate in subtidal zone and estuaries
Pacific cod	Eggs	Coarse sand and cobble bottoms

APPENDIX I. PROPOSED DETERMINATIONS AND CONSIDERATIONS

Under the NMSA, the Secretary of Commerce (delegated to NOAA) may designate any discrete area of the marine environment as a national marine sanctuary and promulgate regulations implementing the designation if the Secretary makes a set of determinations, has considered several defined factors, and consulted with several entities (16 U.S.C. 1433). The "discrete area of the marine environment" that is the subject of this action is the same area that was the subject of the determinations and considerations made when the Sanctuary was designated in 1980 and reiterated in May 2006 when NOAA released a revised draft management plan for the CINMS (see 71 FR 29148; May 19, 2006). Still, the NMSA States that terms of designation may only be modified by the same procedures by which the original designation was made (16 U.S.C. 1434(a)(4)). As such, and because this action proposes to revise the CINMS terms of designation, the determinations and considerations are given below.

Summary of Proposed Changes to CINMS Designation Document

NOAA is proposing to revise the CINMS designation document in two substantive ways. The first change would allow NOAA to regulate the take of all Sanctuary resources in marine reserves, marine parks, and marine conservation areas within the scope of the State of California's Final Environmental Document entitled, "Marine Protected Area in the NOAA's Channel Islands National Marine Sanctuary (California Department of Fish and Game, October 2002). The second change would make minor modifications to the description of the CINMS boundary, noting a slight increase in the overall size of the area to allow four of the marine reserves to have straight line boundaries, for enforcement purposes.

Determinations Required under Section 303(a) of the NMSA

1. The designation will fulfill the purposes and policies of the NMSA.

2. The area is of special national significance due to its conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or esthetic qualities; the communities of living marine resources it harbors; or its resource or human-use values.

Response to 1 and 2: These determinations and findings were made when the Sanctuary was designated in 1980. The Sanctuary, and its associated marine life and historical/cultural resources, possess exceptional value in all categories (conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, and esthetic qualities). The proposed changes would provide additional protection to bottom habitats, water quality, living resources, and historical/cultural resources of the Sanctuary.

3. Existing State and Federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education.

4. Designation of the area as a national marine sanctuary will facilitate the objectives Stated in paragraph 3.

Response to 3 and 4: The original FEIS found that existing statutes did not provide a comprehensive management mechanism for marine waters surrounding the northern Channel Islands. The proposed changes to the terms of designation would allow existing laws relating to marine resource management and marine species protection within the Sanctuary to be supplemented in order to improve resource protection.

5. The area is of size and nature that will permit the comprehensive and coordinated conservation and management.

Response to 5: The Sanctuary's outer boundary would be modified very slightly to accommodate a few of the marine zones being established by the proposed action. This action would increase the overall size of the Sanctuary from 1252.5 nmi^2 to 1268 nmi^2; a 16 nmi^2 increase. This small amount does not change the original determination that the area is of a size and nature that will permit comprehensive and coordinated management.

Considerations Required under Section 303(b)(1) of the NMSA

1. The area's natural resource and ecological qualities, including its contribution to biological productivity, maintenance of ecosystem structure, maintenance of ecologically or commercially important or threatened species or species assemblages, maintenance of critical habitat or endangered species, and the biogeographic representation of the site.

2. The area's historical, cultural, archaeological, or palentological significance.

Response to 1 and 2: The exceptional natural resource and ecological qualities of the Sanctuary are described in the original FEIS on pages 11-55, and an updated description is provided in sections 3.1, 3.2, and 3.3 of the CINMS Draft Management Plan/DEIS (NOAA 2006). The significant maritime heritage resources of the Sanctuary (i.e., historical/cultural resources) are described in section 3.4 of the CINMS Draft Management Plan/DEIS (NOAA 2006).

3. The present and potential uses of the area that depend on maintenance of the area's resources, including commercial and recreational fishing, subsistence uses, other commercial and recreational activities, and research and education.

4. The present and potential activities that may adversely affect the factors identified in subparagraphs 1, 2, and 3.

Response to 3 and 4: A description of the human uses of the Sanctuary and its surrounding areas is provided in the original FEIS on pages 59-90, and an updated description is provided in section 3.5 of the CINMS Draft Management Plan/DEIS (NOAA 2006).

5. The existing State and Federal regulatory and management authorities applicable to the area and the adequacy of those authorities to fulfill the purposes of the NMSA.

Response to 5: Management authorities and associated laws and regulations applicable to the Sanctuary are described in the original FEIS on pages F6-49, and an updated description is found in the CINMS Draft Management Plan/DEIS (NOAA 2006). Existing management authorities were considered in the final rule designating the Sanctuary in 1980 (45 FR 65198). For additional information on how NOAA considered existing management authorities for this action refer to section 4.4 of this document. Appendix F describes the existing Federal and State regulations associated with fisheries management and fishery management plans within the CINMS. The DEIS also addresses their adequacy for the purposes of the NSMA. Section 3.0 of this DEIS also provides information on the existing Cow Cod Conservation Area and the California Rockfish Conservation Area within the CINMS.

6. The manageability of the area, including such factors as its size, its ability to be identified as a discrete ecological unit with definable boundaries, its accessibility, and its suitability for monitoring and enforcement activities.

Response to 6: The proposed changes would not substantially change the overall size, manageability, accessibility, or suitability for monitoring and enforcement activities in the Sanctuary.

7. The public benefits to be derived from sanctuary status, with emphasis on the benefits of long-term protection of nationally significant resources, vital habitats, and resources which generate tourism.

Response to 7: The public benefits from sanctuary status were described in the original 1980 FEIS and final rule designating the Sanctuary (45 FR 65198). The changes to the terms of designation proposed by this action would enhance public benefits by providing for increased protection to habitats and marine life, sensitive marine species, and historical/cultural resources of the Sanctuary while still allowing for continued public use and enjoyment, education, and research of the Sanctuary environment.

8. The negative impacts produced by management restrictions on income-generating activities such as living and nonliving resources development.

9. The socioeconomic effects of sanctuary designation.

Response to 8 and 9: An analysis of the socioeconomic impacts of proposed regulatory changes is included in Section 5.2 of this document. The socioeconomic analysis concludes that impacts of the proposed changes would be less than significant.

10. The area's scientific value and value for monitoring the resources and natural processes that occur there.

Response to 10: The area's scientific value and value for monitoring the resources and natural processes are described in the original FEIS, management plan, and final rule for designation of the Sanctuary. The changes to the terms of designation proposed by this action would enhance the area's scientific and monitoring value by allowing for increased protection to seabed habitats and features, water quality, and living resources of the Sanctuary.

11. The feasibility, where appropriate, of employing innovative management approaches to protect sanctuary resources or to manage compatible uses.

Response to 11: By allowing for the use of zoning, the proposed action itself represents an innovative management approach to further the protection of Sanctuary resources and managing compatible uses.

12. The value of the area as an addition to the System.

Response to 12: This action would increase the overall size of the Sanctuary from 1252.5 nmi^2 to 1268 $nmi^{2,}$ a 16 nmi^2 increase. This small amount added would allow the boundary of four of the marine reserves to be defined by straight lines projecting outside the current CINMS boundary, allowing for better enforcement of the marine reserves. In more general terms, the addition of the marine zones would contribute to the National Marine Sanctuary System by providing for increased protection to habitats and marine life, sensitive marine species, and historical/cultural resources of the Sanctuary while still allowing for appropriate continued public use and enjoyment, education, and research of the Sanctuary environment.


NOAA